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The Influence of Venous Filling on the Heart

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Introduction

THE functional capacity of the heart is a subject of importance from the purely physiological standpoint. Originally, a short contractile tube as in the perivisceral cavity of an ascidian, it is neither structurally nor functionally much entangled with the creature's other organs. But in higher types in which this simple tube is replaced by closed arterial and venous systems ramifying in every organ, we find that the circulatory apparatus has become structurally interwoven with the whole body. And it has become unable properly to fulfill its office without the help of offices that are quite separated from its own, and unless all of its parts act coördinately, each adequately fulfilling its own distinct and special function.

But the subject assumes practical and commanding significance from the clinical standpoint. The efficiency of the vasomotor system, the nervous system and the condition of the other organs of the body all affect the adequacy of the heart's action. These factors are variable, closely related to each other and create the difficulties in the clinical application of any test for the functional capacity of the heart.

The physiological basis for these, however, has remained in many instances an unturned soil. During the past years, I have carried out some experiments with the hope of perceiving some light on the physiological basis for some of these tests.

Most of the tests of heart function are based upon the circulatory changes produced by muscular exertion. The clinical symptoms and physical signs may indicate the direction, but probably not the exact level of cardiac efficiency. Changes of pulse rate and blood pressure reveal important criteria in the study of heart function. The technical methods, the sphygmograph, the electrocardiograph and the Roëntgen ray have proven themselves valuable adjuvants.

A more or less complete analysis of heart function, particularly from its clinical aspect, therefore, would comprise the following studies:[1]

I. Significant physical signs and symptoms.

II. Blood pressure studies and the estimation of the absolute amount of work done by the heart.

III. Cardiovascular response to a general demand for increased circulation.

1. Methods depending upon variations in pulse rate.
   a. The effect of change of posture upon the pulse rate.
   b The effect of exercise on the pulse rate.

2. Methods depending upon variations in blood pressure.
    a. The effect of change of posture upon the blood-pressure.
    b. The effect of exercise upon the blood pressure.
    c. The effect of increasing arterial resistance on the blood pressure.

IV. Tests of efficiency of the right side of the heart.

V. The polygraph.

VI. The electrocardiograph.

VII. The Roëntgen ray and orthocardiograph.
    1. The variations in the size of the heart during and after work.

VIII. Metabolic changes in impaired heart function.
    1. Vital capacity of the lungs in relation to heart function.
    2. The elimination of salt as an index of heart function.

The aim of testing the functional capacity of the heart is essentially to determine its response to a demand by the muscles or organs of the body for increased blood supply. The complex processes of life call for cardiac reaction not alone in response to muscular and organ action, but also to visual and auditory stimuli not measurable in terms of physical work.

Changes in flow of the blood throughout the body may be occasioned by nervous influences, vascular dilatation and contraction, and by alteration of the heart's action. The first two factors are very variable.

It is the aim of functional diagnosis to estimate the functional integrity of the heart as a pump, to learn if the heart may submit to the usual demands of active life, and if it can undergo an anticipated amount of strain, such as is entailed by exercise, anesthesia, child-birth, febrile toxemia, etc.

Functional diagnosis should also serve as a clinical index of the increase or diminution of the heart's efficiency with the course of time.

In a comprehensive study of the heart's efficiency, therefore, it should be our aim to ascertain which of the various portions of the cardiovascular mechanism are intact and which are deranged, to what extent the derangement of structure and function affects the circulation of the blood, and to what degree it affects the normal activity and longevity of the individual.

The complementary action of the vasomotor system is very important in maintaining adequate circulation. This factor is different in different individuals and its variations are perhaps the greatest source of error in determining the efficiency of the heart.

From the combined study of the functional organization by means of clinical observation and the use of various technical methods, a fair estimate may be obtained of the functional capacity of the heart.

Perfect functioning of the heart would imply a state in which all the qualities of the cardiac structure are normal and coördinate. In no organ is exemplified to a higher degree the fact that the mutual dependence of functions is proportionate to their

specialization. If any of the qualities are deranged, to that extent will the normal function of the whole organ be disturbed. The recognition of such derangements of function and of their significance forms a part of the study of the efficiency of the heart.

As a preliminary thesis, therefore, to the more comprehensive title, I have endeavored in the series of experiments here reported to ascertain and determine the influence of venous filling upon (1) the heart rate, (2) the carotid pressure, (3) the heart volume as determined especially by the plethysmograph, (4) the intraventricular pressure curve in the left ventricle, and (5) the influence of dilatation of the right heart upon the electrocardiogram.

Method

The experiments were performed on dogs between six and nine kilos in weight under ether anesthesia in the supine position, attached horizontally to the operating board. The latter was so arranged as to pivot on a bar at the level of the dog's heart so that the position of the dog's heart could remain unchanged whereas the hind legs could be lowered or raised with the heart at the axis. (Fig. 1)

After tracheotomy, the carotid artery was cannularized to yield the blood pressure readings, recorded through the medium of sodium sulfate solution leading to a mercurial manometer.

The jugular vein was opened and a long metal or glass cannula inserted down into the superior vena cava to register the central venous pressure.

Through this cannula, injections were made of definite varying amounts of isotonic solutions and their effects noted. Normal saline was employed; and to eliminate the difference in viscosity, a solution of 5 per cent. gum acacia in saline as well as Ringer's solution was used in some of the experiments.

The thorax was opened and the anesthesia maintained by insufflation. Records were obtained of intrapleural pressure changes.

In some experiments, a plethysmograph was applied over the ventricle of the heart and the effect of the injections noted. In other experiments, a sulfate cannula manometer was inserted into the left ventricle and the intraventricular pressure changes were thus recorded by means of the apical manometer. This registered the variations of the left intraventricular pressure as affected by the increased venous filling.

Electrocardiograms were taken to note the effects of increased venous filling upon the heart mechanism and, especially in the later stages, to note the effect upon the electrocardiogram of marked dilatation of the right heart such as took place in these experiments.

In some experiments venous filling and change of venous pressure was obtained by change of posture of the animal.

Influence of Change of Posture on the Central Venous Pressure and on the Heart Rate

The influence of change of posture on the heart rate was determined experimentally mainly because this method has been advocated as a clinical test of the functional capacity of the heart.

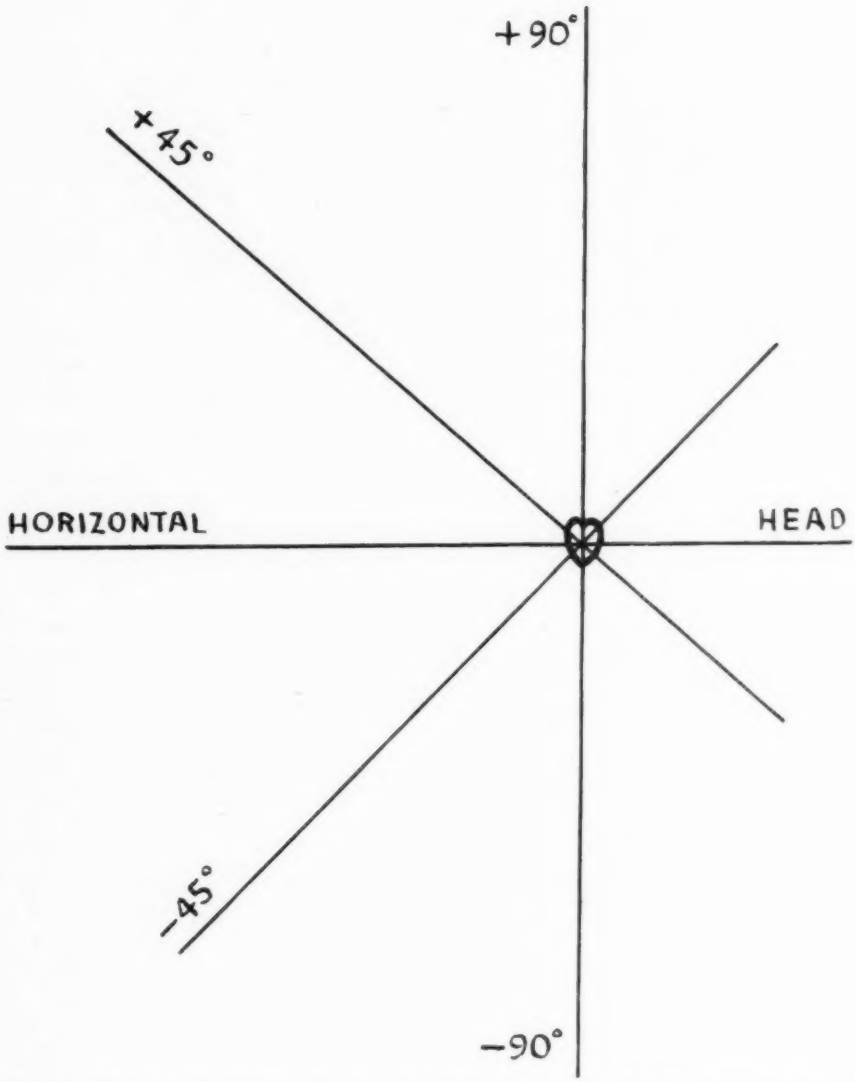

FIG. 1. Diagram illustrating changes of posture effected in the experiments by pivotal rotation of the operating board.

Records were taken with dog in the horizontal position. The lower or hind leg end of the board was then elevated to an angle of +45 degrees above the heart. It was then lowered again to the level position for a short period and then —45 and —90 degrees below the level and a continuous tracing taken during all these procedures. The experiment was repeated several times. (Fig. 2a)

FIG. 2a. Influence of change of posture on the central venous pressure, on the intracarotid pressure and on the heart rate.

Summary of Results

1. Change of posture with relation to the heart increasing the central venous pressure produced increase of the heart rate but no characteristic effect on the respiration rate.

2. Change of posture with relation to the heart changed the intra-carotid pressure characteristically; an elevation of the main field of the circulation above the level of the heart raised the intra-carotid pressure, and a lowering below the heart level diminished it.

3. Parallel effects are seen in the changes in the central venous pressure; i.e., raising the body above the heart level raised, and lowering the body below the heart level lowered the intracaval pressure.

4. As in the later experiments, the quickening of the rate of the heart with change of posture was found to be reflex in origin since it no longer occurred after the division of the vagi nerves. (Fig. 2b)

Discussion From the Clinical Aspects

Henderson and Haggard found that systolic and diastolic pressures, measured by the sphygomomanometer method in man, failed to increase when a person is tilted on a board from a horizontal to a head-down position—a procedure obviously increasing the venous return and auricular pressure.[2]

This is difficult to understand since their experiments were always attended by heart rate changes, and in view of my experiments and certain clinical studies which I have previously made.[3] I have shown that changing the position of the arm alone even, as in elevating the elbow, produces changes in the blood pressure of the arm as the result of both vasomotor and hydrostatic effects upon the column of blood. I showed that the normal effect of raising the arm is a progressive fall of the systolic and diastolic pressure readings as the arm is raised upward; the amount of fall increases with the elevation.

We may, therefore, consider the effects of posture on the heart action as parallel with the effects of venous filling or changed venous pressure and shall incorporate and correlate the results of these experiments with those in which injections of isotonic solutions were made.

The Influence of Venous Filling on the Heart Rate

No definite explanation of the ancient observation that the pulse rate in human beings is normally slower in the recumbent than in the erect or semi-erect position was forthcoming until the past decade.

Bainbridge[4] experimented with the injection of blood or normal salt solution into the jugular vein in dogs, and came to the following conclusions:

1. Increased venous filling of the heart by blood or saline solution leads to a rise of venous pressure and to acceleration and dilatation of the heart; the arterial pressure rises slightly or remains steady.

2. The quickening of the rate is reflex in origin since it no longer occurs after division of the vagi and cardiac accelerator nerves.

3. It is due chiefly to diminution of vagus tone and partly to increased accelerator tone; there is no evidence

FIG. 2b. Same after section of both pneumogastric nerves.

that the activity of the suprarenal glands is increased.

4. The acceleration is not necessarily or usually accompanied by changes in arterial pressure or in the respiratory movements.

In my experiments in which the filling was induced and altered by position of the animal, the effects were quite characteristic. (The results are illustrated in Fig. 2). The pulse rate of 168 falls as the venous filling is lessened and rises as the animal returns to the horizontal position. When the vagi are cut, the relation of venous filling to heart rate disappears. This holds true for those experiments in which the filling is done by injections of fluid as Bainbridge has shown or by distending the right auricle by means of a balloon through the opened chest as Sassa and Muazaki[5] have shown.

The rate of the pulse seems to maintain a relationship to the changes of pressure following injection. During the immediate injection of fluid the pulse rate may either rise or fall or remain unchanged while there occurs an immediate elevation of pressure. The pressure then falls while the pulse rate augments, and this continues with slight variation for about one minute.

Where the rate was studied carefully in its relation to the pressure curve in some experiments, it became evident that a delicate self-adjusting nerve mechanism between the heart rate and the aorta is in constant action. As Bainbridge showed, the rise of blood pressure by stretching the aorta stimulates the depressor vagus fibers ending in its wall and causes through the depressor reflex a slowing of the heart beat. The fall of blood pressure that follows will quicken the heart beat. The lessening of aortic tension, as has been shown by Osborne,[6] stimulates the vagus fibers differently from those stimulated by stretching and causes reflexly a quickening of the rate.

The probable reason why, in some of my experiments, I found a fall of rate immediately upon injecting a large amount of fluid or injecting fluid rapidly is that, when the diastolic volume of the right heart and the arterial pressure are simultaneously increased, both the accelerator and the inhibitory cardiac reflexes are set in action although the inhibitory reflex is the more powerful. During venous filling the diastolic volume of the right heart is increased, while the peripheral pressure is undergoing its various phases. This is illustrated in figure 3.

I have made 88 observations in the course of ten experiments on anesthetized dogs on the effect of increased venous filling on the heart rate, and six of these observations were made after the vagi had been cut.

Summary of Results

Increased venous filling by means of injection of isotonic and isothermal solutions produced an increase of the heart rate depending upon the quantity injected and the rate of injection. The viscosity of the solution played no part in this reaction as Starling and Patterson have found in their "heart-lung" preparation.[7]

I found that the character of the injected fluid, except in so far as this raised, the venous pressure, did not alter the cardiac response. But, contrary to Bainbridge, I found that the

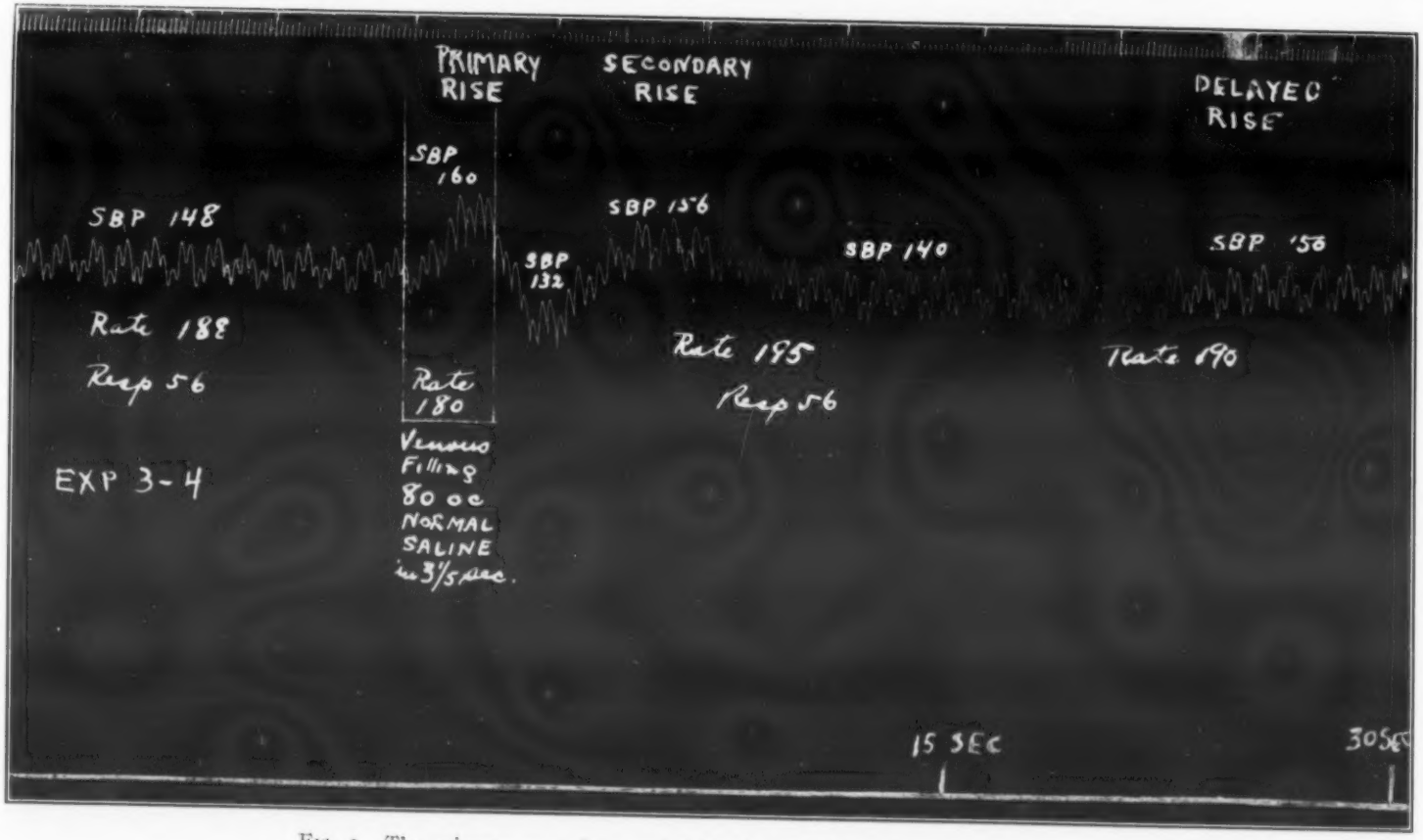

FIG. 3. The primary, secondary, and delayed rise of blood pressure following venous filling. Note the fall of the heart rate immediately upon rapid or excessive venous filling.

amount of injected fluid and the rate of injection did distinctly affect the response of the heart.

Discussion from the Clinical Aspect

As early as 1833, Donnell showed that the pulse rate is normally slower in the recumbent than in the erect or semi-erect position.[8] Schapiro made the observation that the normal difference disappears when the heart is seriously weakened.[9]

Hogerstedt and Graupner[10] noted the return of the pulse difference after the effect of digitalis upon the heart was established. In 100 cases recently tested,[11] it was found that the slowing of 7 to 15 beats per minute which recumbency normally produces is diminished or altogether lost in cases of incompetent valvular disease or when the heart is seriously weakened by any cause. Geigel found that a variation of pulse rate above 30 between lying and standing or an inversion of the normal relationship between lying and standing indicates a weakened heart function.[21]

In a group of 124 men with clinically normal hearts studied by me,[13] the pulse rate rose an average of 16 beats on change from the seated to the erect posture. The variations from the average were comparatively slight; the maximum rise was 28 in a few cases, and the minimum in one case was 0; the most frequent figures were 12, 18, 24.

Psychic factors may considerably disturb the correctness of the estimate in any particular case. The normal increase from reclining to standing posture should never be more than 20 beats per minute.

From the postural experiments on dogs, one might question why the heart rate should not increase with recumbency since that position increases the venous filling. The explanation probably lies in the fact that in the erect position, the lessening of aortic tension, as Osborne has shown, causes reflexly a quickening of the rate.

Prevel[14] considers the mechanism causing the acceleration of the pulse on changing from the reclining to the upright position an abdomino-cardiac reflex. The contents of the abdomen slide down, inducing the acceleration of the pulse as the gastric ramifications of the pneumogastric are stretched.

The variations of the pulse rate following exercise were the first to be studied in their functional significance. Mendelsohn and Graupner[15] estimated the length of time it takes for a normal heart to return to its previous rate after a measured amount of work. The time it takes for any given heart to return to normal after a definite amount of exercise was then suggested as a measure of its functional capacity. The longer the time it takes to return to the normal rate, the less efficient the heart is considered.

Mendelsohn asserted it as a principle that, the greater the amount of work done with prompt return to the normal rate, the greater is the functional capacity of the heart. He emphasized the point that the amount of work should be considered as of relative value only. Absolute amounts of work cannot be laid down as the normal for any person because the capacity for work varies with the weight, muscular development and general makeup of the individual.

Influence of Venous Filling on the Blood Pressure

From one standpoint, it may be theoretically assumed that the increase in heart rate and the pressure changes that follow venous filling are analogous to those changes that take place after exercise. Muscular work mechanically increases the amount of blood returning to the heart. Tachycardia, as has been shown, would result in a measure proportionate to the amounts of work performed in a given period. Upon the subsidence of the work, the cardiac intake diminishes and the heart rate promptly falls.

Normally, an increase in systolic pressure takes place simultaneously with the work and in a way this is proportionate to the amount of the work. The pressure rises to its highest point at the end of the exercise, and then promptly falls within a period of two minutes. Upon this principle are based a number of tests of the functional capacity of the heart as evidenced by its reaction after exercise.

From my experiments conducted on this subject, it appears that venous filling is followed by a characteristic form of pressure curve depending upon the amount of solution injected, the time in which it is introduced, and the previous condition of the heart and circulation.

For the convenience of description, the three curves that take place may be called the primary or immediate rise, the secondary rise and the delayed rise. (Fig. 3)

The injection of a small amount of fluid, such as will apparently not tax the heart, gives rise to an immediate elevation of the carotid pressure followed by a prompt, though slightly more gradual fall ,to about the previous level. Analyzing the tracings carefully, this fall, in every instance, appears to be slightly below the previous level with a gradual return to the normal within about one minute.

When the heart has already been overtaxed by previous injection of solution, or when it has not quite recovered from the previous injection, or when the injected quantity is great, then the form of the curve, although analogous to the one previously described shows distinct accentuations of the primary rise, a slight fall, a secondary rise, and finally, a fall below normal and a delayed rise. This is characteristically illustrated in figure 3.

When large amounts are injected suddenly into a normal dog's heart the first rise is followed by a slight fall immediately upon the cessation of the venous filling, or in slow injections when a large enough amount has been introduced. This is followed by an immediate rise of short duration and a more gradual fall returning to the normal within a minute.

If the blood pressure is, therefore, measured at intervals of 15 seconds following the injection, it will be found that the pressure will rise in the series of readings until about one minute after the injection. (Fig. 4)

It would thus seem that overwork of the heart muscle stimulated by venous filling occasions, or at least markedly exaggerates, what may be called "a delayed rise of blood pressure."

When, however, the heart has been excessively overfilled and an injection subsequently made, the form of curve,

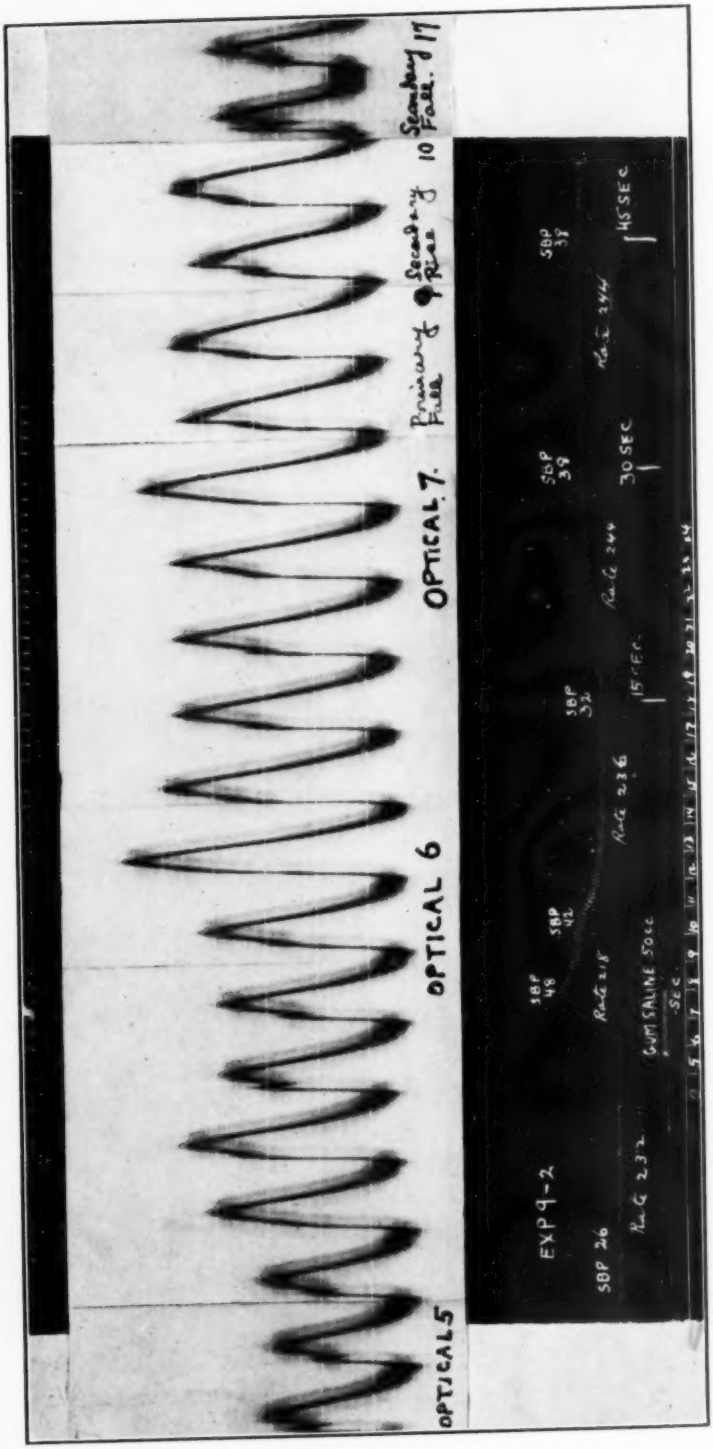

FIG. 4. Blood pressure and intraventricular pressure curves produced by venous filling.

although still maintaining the same outline, becomes more level throughout and the changes are not so marked.

It is interesting to note, as can be easily understood, that if the right auricle is distended by means of a balloon there do not occur any marked changes in the arterial pressure.[5]

Discussion from the Clinical Aspect

Graupner's Test—Graupner's test for estimating the functional capacity of the heart depends upon the principle that the reaction of the weakened heart to a measured amount of work differs from the reaction of the normal heart. In this test a definite amount of work is executed by a group of muscles measured by a Zuntz ergometer, and blood pressure estimations are made before, during and after the work.[16]

Gräupner reached the following conclusions:

1. A moderate amount of work, in normal hearts, will cause a rise of blood pressure after the work. This either promptly returns to normal or remains constant at the higher level for a period, but does not fluctuate and gradually returns to normal.

2. The greater the amount of work done, the higher the rise of blood pressure, and the quicker the return to normal, the more efficient is the myocardium.

3. A sinking of the blood-pressure after muscular exertion, declining from the start, or even a very slight rise after work of about ten mm. mercury, which falls again almost immediately to below the original point is evidence of incapacity of that heart for that amount of work.

4. If the blood pressure remains high for a period after the work and then suddenly falls, it is evidence of overstrain or fatigue.

5. If the blood pressure after work is lower than normal, and then slowly returns to normal but does not rise above normal, a primary myocardial weakness exists. This reaction is characteristic of myocardial insufficiency.

Graupner's test depends upon the fact that the ventricle reacts to muscular work which at first increases the blood pressure. If the ventricle proves unequal to the task of maintaining the pressure, there occurs a compensatory increase in pulse rate but a fall in blood pressure.

Barringer's Test—Arno Lehndorff[17] showed experimentally in 1908 that stimulation of the splanchnics produces their contraction with increase of blood pressure to a varying degree. If the heart's action becomes insufficient, however, the blood pressure falls. With the recovery of the heart's contraction, the pressure rises again.

Some years ago Barringer described a test of heart function, using Graupner's method of making frequent readings of the pulse rate and systolic blood pressure after a measured amount of work and clinically obtaining Lehndorff's experimental results in insufficiency of the heart.[18]

The theoretical considerations Barringer presented as follows:

Muscular work increases the CO_2 content of the blood. This stimulates the nervous centers controlling the suprarenal glands. An increase in the adrenalin content of the blood is thereby produced, which causes a constriction of the vessels in the splanch-

nic area and a resulting rise in blood pressure. The quickened heart rate accompanying muscular work causes an increase in the quantity of blood discharged by the heart per minute and this also contributes to the rise in blood pressure.

The systolic pressure during work therefore mounts rapidly and the left ventricle finds it more and more difficult to expel its contents against this increasing resistance. At a certain height of aortic pressure the ventricle probably does not empty itself completely and a steadily increasing volume of blood remains in the heart after each systole. In other words, an insufficiency exists. At this moment the Roëntgen ray would possibly show a heart decidedly increased in size. If the work stops, the CO_2 content of the blood falls, the activity of the suprarenal gland decreases and the splanchnic vessels relax. The blood pressure therefore begins to fall. But the heart now works more efficiently against the lowered aortic pressure and expels a larger quantity of the increased residual blood at each stroke until it finally empties itself completely with each systole. The increased quantity of blood which the recovering heart thus throws into the aorta more than compensates for the lowered pressure. The pressure therefore again rises briefly.

This delayed rise of blood pressure after the cessation of muscular work is the significant point in Barringer's test.

When the work stops, if the heart is much dilated, it probably requires a short time to reach its maximum efficiency to expel its increased content and there results a slowly mounting blood pressure.

The clinical experiments reported by Barringer and others indicate that in blood pressure reactions to graduated work we possess a valid test of the heart's functional capacity. If the systolic blood pressure reaches its greatest height not immediately after work, but from 30 to 120 seconds later, or if the pressure immediately after work is lower than the original level, that work, whatever its amount, according to Barringer, has overtaxed the heart's functional capacity and may be taken as an accurate measure of the heart's efficiency.

Barringer found that the delayed rise in systolic blood pressure was obtained after large amounts of work which varied normally according to the subject's physique and condition of muscular training.

In a subsequent study of Barringer's method, Rapport asserted that Barringer's method of ascertaining the shape of the blood pressure curve excludes the variations of pulse rate and blood pressure which may be an exact expression of real events, and does not indicate the capacity of the heart to do work.[19]

It would therefore seem that my experiments present an experimental basis for the Barringer tests in which a delayed rise of pressure occurs when venous filling is excessive. Barringer's hypothesis and explanation of the mechanism of the occurence of the delayed rise in his clinical studies admit of some question, especially as there is no experimental proof to show that the H ion concentration of the blood and

the increased adrenalin content produce the changes that are described.

Influence of Venous Filling on the Intraventricular Pressure Curve

Before taking up my results of the influence of venous filling on the intraventricular curve, it is not amiss to state briefly the findings that have already been obtained and to summarize the physiology relating to this subject.

The curve in the two chambers does not differ in its essential features. The auricular contraction causes a wave which is followed by a rise during which the semilunar as well as the auriculoventricular valves are closed, and hence the heart contracts isometrically. After the opening of the valves, the rise continues for a brief interval and the intraventricular pressure responds by a slight though much damped oscillation to the primary rise, present in the arterial system. During the ejection period the contour corresponds to the top of the arterial curve since ventricle and arteries form a common cavity. The pressure continues to rise, and late in systole reaches a summit from which it gradually recedes to where the beginning of relaxation causes a sharp drop of pressure to the base line.

The first phase of ventricular systole, extending from the beginning of the pressure rise until the opening of the semilunar valves, is preferably designated as the isometric contraction phase.

The auricular pressure determines the gradient of the isometric rise, the curves becoming steeper with each increase in pressure. The contour of the ejection curve is also secondarily modified.

As soon as intraventricular pressure exceeds intra-aortic pressure, the semilunar valves open and a comparatively large volume of blood per unit is ejected. As long as the volume ejected remains greater than the outflow from the peripheral arterioles, the intraventricular pressures continue to rise. This summit marks the end of a second phase of systole which Wiggers designated as the maximum ejection phase.[20] As soon, however, as the volume of the systolic discharge decreases to such an extent that it no longer equals the peripheral outflow, intraventricular pressure begins to decline. This third phase may be designated as a phase of reduced ejection. It terminates the period of systole.

At the onset of ventricular relaxation, the approximation of the semilunar valves is signaled by a sharp drop in the intraventricular pressure designated as the incisura. This marks a fourth or protodiastolic phase of the ventricular cycle. Following the closure of the semilunar valves and until the a-v valves have opened, the ventricle relaxes without any flow of blood either from or into its cavity. This phase may be designated as the isometric relaxation phase.

Starling and his collaborators by means of their "heart-lung preparation"[21] and Straub and Socin[22] have shown that when venous pressure increases above normal, the systolic stroke is greatly increased. Starling and his associates, Socin[23] and DeHeer[24] found that within wide limits the heart is able to increase its output in direct proportion to the venous inflow.

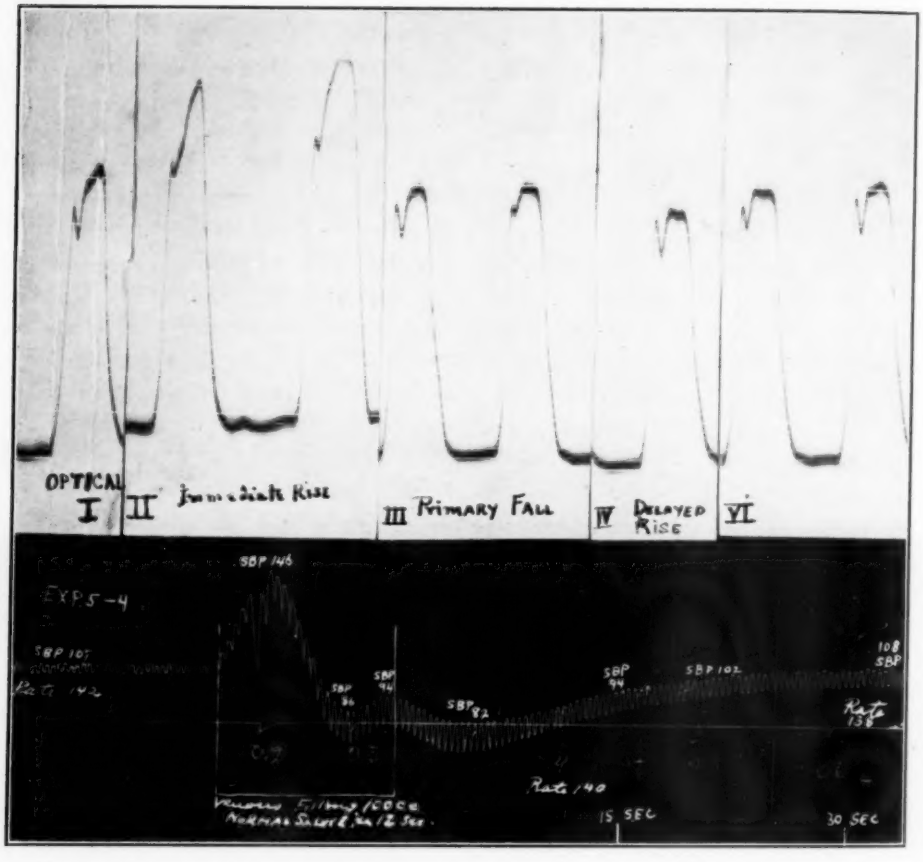

FIG. 5. Intraventricular pressure curves produced by venous filling; the curves were made by means of the Franck capsule, each section is numerically indicated by a corresponding signal on the smoked tracing below.

Wiggers showed that saline infusion causes a definite prolongation of the ejection phase quite independent of the length of the diastole and that the systolic discharge of the heart may not be regulated by changes in the duration of cycle alone.

As the heart accelerates and the cycle shortens, the succeeding diastolic filling is encroached on more and more until the diastolic inflow is abbreviated and systolic discharge is greatly affected. This tendency of the diastolic filling to be decreased as the heart accelerates is one of the fundamental compensatory mechanisms which prevents an excessive minute volume from being discharged during rapid heart action.

As Wiggers has shown the initial pressure increase in the right ventricle was always associated with an increase in initial diastolic volume. When the initial pressure becomes elevated to an excessive degree, the intraventricular pressure-maximum no longer in-

creases but becomes lower at the same time that the systolic discharge lessened. When the heart is long distended by a great inflow its subsequent power of response is reduced. The irritability of the heart may also be depressed or stimulated by chemical agents, in which case the pressure-maximum and systolic discharge are not related to the initial pressure.

When the heart was obviously dilated, neither increased initial pressure nor increased initial length determines the vigor of the ventricle as the myocardium is depressed.

Viewing all the experimental evidence in the light of the more fundamental work of Blix, Hill and others on skeletal muscle, we must be ready to admit that the dynamic efficiency of the ventricle may be fundamentally determined by such factors as initial length, diastolic surface-volume relation, and initial tension.

The ventricles are filled to capacity even under very low auricular pressures. It would seem that any additional increase in volume must necessitate a stretching of the elastic and tonic walls of the ventricle. This requires an increased auricular and increased initial pressure. The pressure required to stretch the walls sufficiently to admit a definite volume increase need not be great, if the tonus is low; but must be considerable if it is high.

The series of tracings from my experiments and the subjoined legends illustrate the changes that take place under the conditions of the experiments. (Fig. 6)

The effect of venous filling on the intraventricular pressure as evidenced by the tracings obtained by means of the optical manometer is quite characteristic. As has been shown by Wiggers, any sudden increase in venous filling which increases the volume of the ventricles always promptly elevates the initial tension and pressure-maximum in both ventricles. After the injection of solution there is definite increase in the systolic discharge in a few seconds. Toward the end of the infusion, a further elevation initial or maximum pressure in the ventricles is observed.

When the arterial resistance increases as by mechanical compression of the aorta as was done in one of my experiments, the initial pressure is elevated. (Fig. 7) This is due to the dilation of the ventricles that it causes, i.e., to increase in the length of the muscle fibers. It is by overdistension of the right heart, due to the high venous pressure, that the heart finally fails.

Discussion from the Clinical Aspect

Normally the wave caused by the auricles discharging their contents into the ventricles may be absent from the cardiogram of the apex beat or may present itself as a slight elevation just preceding the systole of the ventricle. The resistance to the auricular current offered by the wall of the ventricle is analogous to that offered by contracted arteries to the systole of the heart.

There are two important conditions which would have the effect of increasing the size of the wave due to auricular systole: (1) Relative hypertrophy of the auricles with increase in the force of their impulse and (2) loss

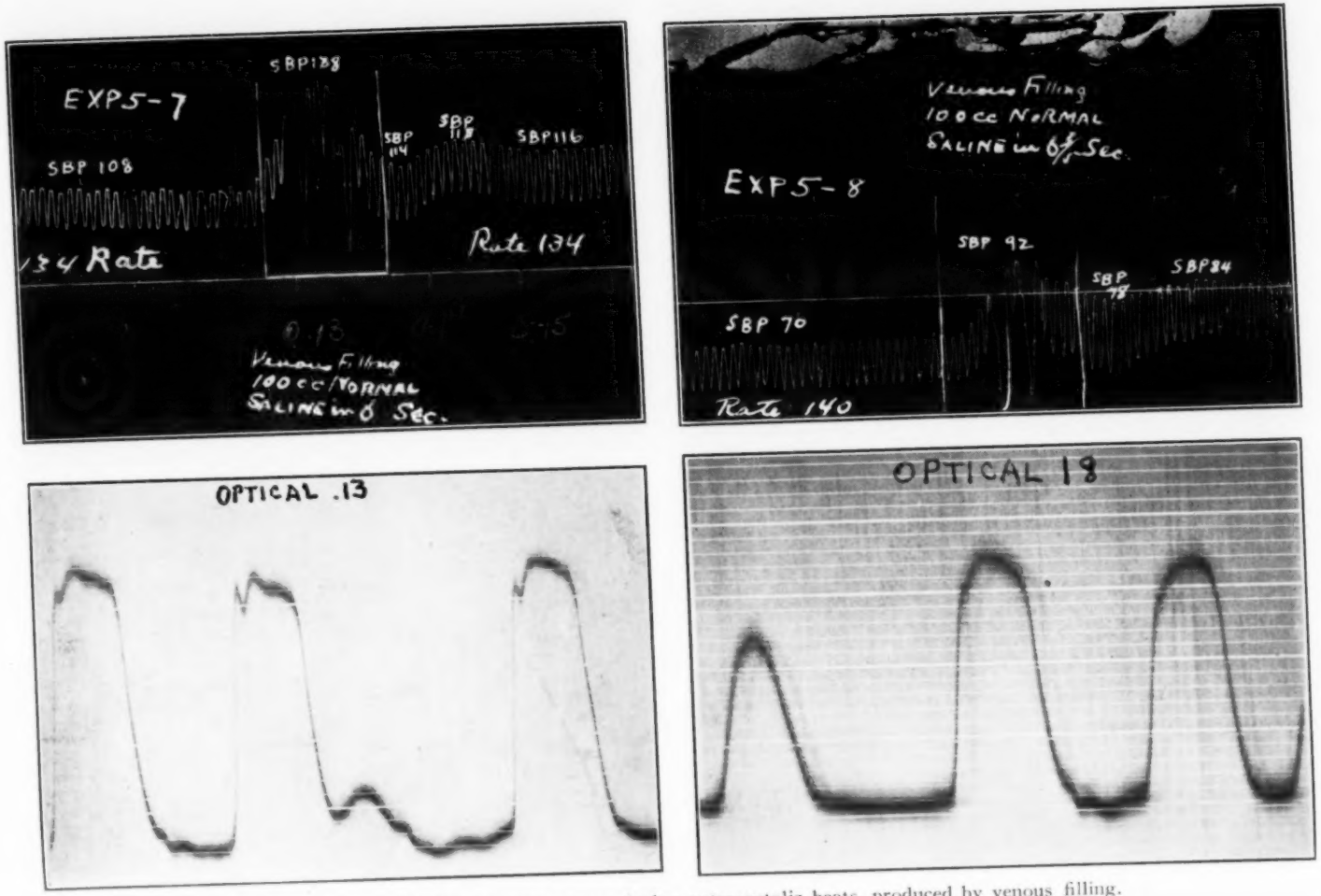

FIG. 6. Intraventricular pressure curves during extrasystolic beats, produced by venous filling.

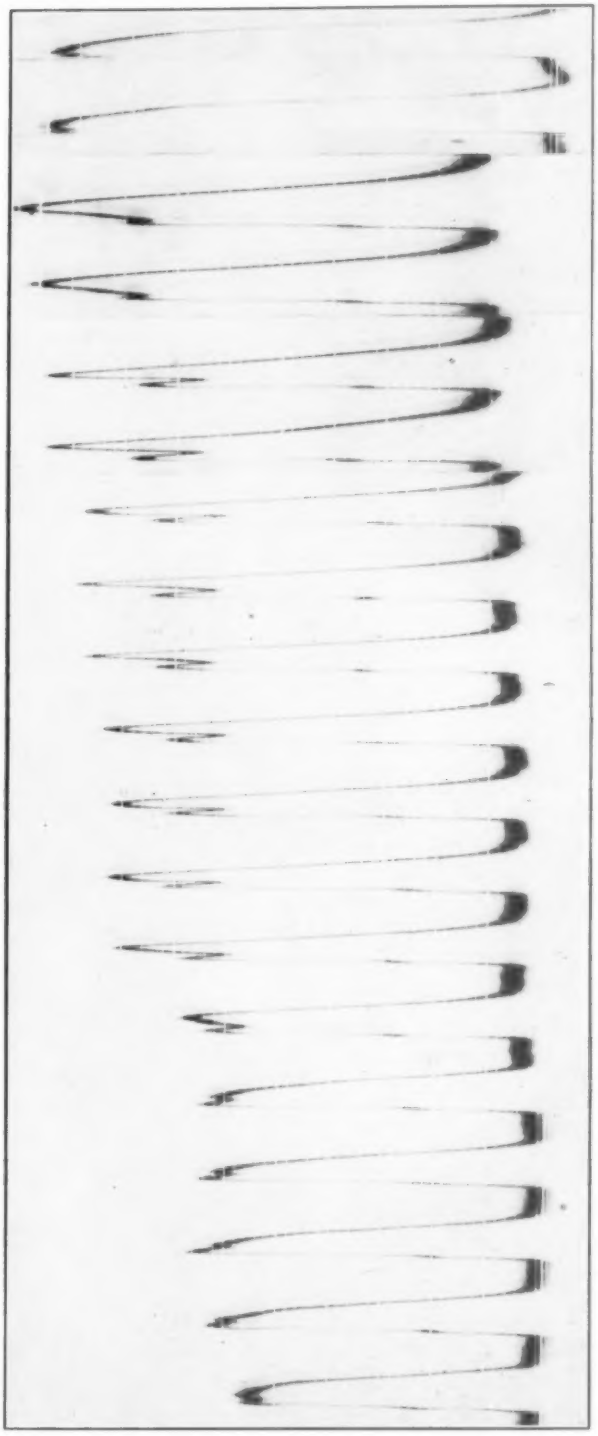

FIG. 7. Intraventricular pressure curves during venous filling with simultaneous compression of the aorta, and resulting progressive dilation of the heart.

FIG. 6. Intraventricular pressure curves during extrasystolic beats, produced by venous filling.

of tonicity of the ventricles with dilation and thinning of their wall.

(1) With reference to the wave "a" of the cardiogram in cases of mitral stenosis, it shows itself as a thrill or series of waves at the beginning of systole and not as a distinct single impulse.

(2) Loss of tonicity of the ventricular muscle increases the prominence of the "a" wave in the apex curve. In this condition the heart lies markedly dilated against the chest wall. The rise of the "a" wave is abrupt, the curve of filling is steeper than normal.[25]

The Influence of Venous Filling on the Production of Extrasystoles

Among the abnormalities of cardiac mechanism induced by venous filling, extrasystoles are particularly frequent. They are apparently of ventricular origin. They occur in most instances only after the heart has been considerably distended by fluid. Their first appearance is usually immediately upon the injection of a large quantity of fluid at the height of the primary rise of blood pressure. They promptly disappear and do not recur if the heart is not further tried. The tracings show plainly that they occur at the time of greatest heart strain, and when the demand upon the heart is greatest for a readjustment of its action. (See fig. 6)

Influence of Venous Filling on the Heart Volume

Changes in the length of the muscle fibers, as Frank, Patterson, Piper and Starling and others have pointed out, may be evaluated most satisfactorily by studying the changes in the ventricular volume during consecutive phases of the heart cycle.

Patterson, Piper and Starling found that when the venous inflow increases, the ventricles are more distended in diastole and the systolic discharge increases. The initial tension in the left ventricle, however, may not increase, but, on the contrary may actually be lower. Nevertheless, the intraventricular pressure-maximum appears to rise.

Straub found that when the inflow rate is increased, the two ventricles dilate somewhat and expel larger systolic volume. The intraventricular pressure curves taken from the two ventricles showed differences. In the right ventricle, changes similar to those reported by Wiggers were constantly observed, i.e., increased diastolic filling always occasions an increased initial tension and a higher pressure-maximum. In the left ventricle and in confirmation of Starling's results, no changes in initial tension occur although the pressure curves did become somewhat higher. According to these results, the increased discharge of the right ventricle is unable to affect the diastolic filling of the left sufficiently to cause an elevation of initial tension.

The plethysmographic curves taken in my experiment show an increase of the ventricular portion of the heart in its diastolic volume, a diminution in its systolic volume, and therefore an increased intake and output as a result of venous filling. (Fig. 7)

The Influence of Venous Filling on the Electrocardiogram

I endeavored in this thesis to ascertain if pure dilatation of the right

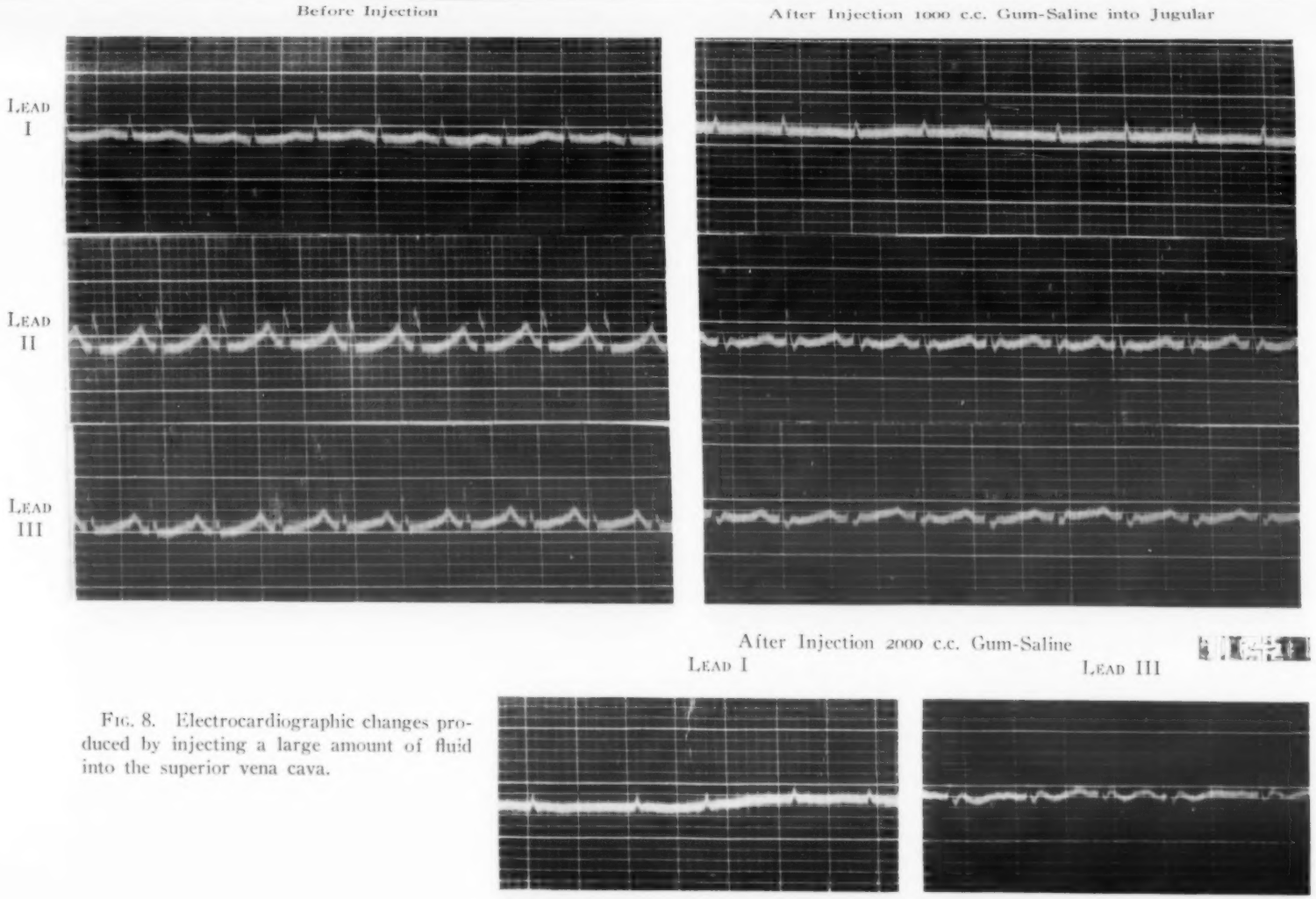

Fig. 8. Electrocardiographic changes produced by injecting a large amount of fluid into the superior vena cava.

ventricle will produce an electrocardiogram indicating right ventricular preponderance.

I therefore obtained the three leads of an electrocardiogram from a normal dog. I then injected about 1000 c.c. of gum saline solution through the jugular vein and repeated the electrocardiogram. Continuing the injection during the course of this experiment, I repeated leads I and III and obtained the prints recorded in fig. 8. Analyzing these, it is evident that a striking change was produced in the form of the electrocardiogram by the injection of a large amount of fluid into the right heart. There is noticeable a distinct suggestion or indication of right predominance.

The particular change noted is a diminution in the voltage in all three leads. Equally important and significant is the alteration in the form of the S-T phase progressively assuming a negative direction with final inversion of the *T* wave. The clinical interpretation is important: This suggests that inversion of the *T* wave in lead III is a significant sign of cardiac stress or dilatation.

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A New Instrument Utilizing Controlled Air Pressure for Dilating Spastic Lesions of the Esophagus (Especially of the Cardia).

By Frank Smithies, M.D., Sc.D., *Chicago, Ill.*

FOR more than ten years there has been no advance suggested in instruments constructed for the purpose of treating esophageal lesions of the "spastic type (esophagismus, spasm at the cardia, cardiospasm).

This report describes a dilator useful, particularly, in the radical local management of cardiospasm associated with diffuse dilation of the esophagus.

Commonly, instrumentation for the relief of this syndrome is attempted by the "hydrostatic," elongated balloon described many years ago by Henry Plummer. Excellent though Plummer's apparatus is, it has several faults and limitations: (1) A source of running water is required: such demand limits use of the instrument to a specially arranged office or clinic room; (2) a special adaptor is requisite to connect the dilator with the water supply; (3) the whalebone staff, employed to carry the balloon to the cardia, "shreds" and swells when wet, resulting in its definite weakening, in dirt collection, and, what is most important, so narrowing the lumen of the rubber tube carrying the water about it, as to interfere seriously with controlled filling, emptying and quick removal of the dilating balloon in emergencies; (4) the large water pressure gauge is unwieldy, expensive and often in the way; (5) adjustment of the silk sac and rubber balloons is difficult; these necessary appendages must be specially shaped and made—a not inconsiderable expense item; moreover, many instrument supply houses do not carry the silk sacs and rubber balloons in stock; much delay in replacement of a damaged part often is experienced.

The dilator developed by me, with the technical assistance of Mr. Hutchcraft of Sharp & Smith, Chicago, is designed to remedy some of the limitations of Plummer's appartus. It is a "*pneumatic,*" not a "*hydrostatic*" dilator. Hence, it is readily portable; requires no special connection to water or air supply; is clean and easily handled; needs only a small pressure gauge; has no whale-bone staff to interfere with rapid and accurate distension and deflation of the dilating balloon; has a double safety control against over-distension and to facilitate rapid deflation of the balloon and quick withdrawal of the instrument in emergencies; its balloons and restraining sac are constructed of material readily available and easily adjusted. The en-

tire apparatus can be distributed at a reasonable cost and its several parts are conveniently replaceable. Finally, the length of the guiding staff of the instrument is adequate, whereas practically all the esophageal dilators on the market, whether of the olive or the balloon type, are too short, by many inches, for practical employment.

mer) which is tunnelled so as to permit the introduction of a stout, silk-twist thread as a guide through the narrowed esophagus or cardia. The tip is available in standard sizes. The steel staff is 30 inches long and chromium plated. This increased length over staffs usually sold with "hand-me-down" instruments, is of great prac-

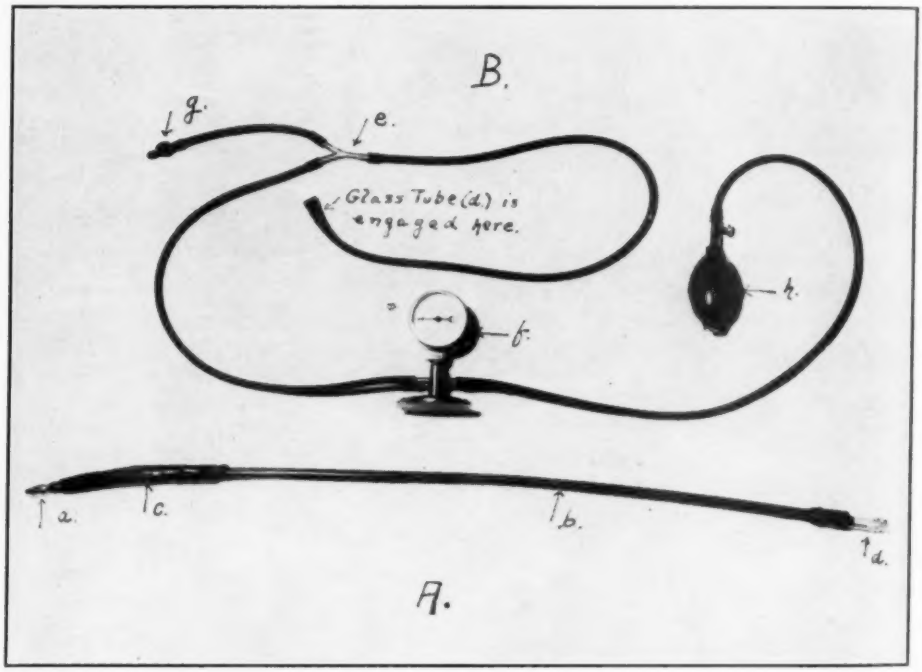

Fig. 1—Photographs A and B

Our apparatus conveniently may be described in two sections: (a)—the expansile dilator with its staff for introduction and (b)—the mechanism for inducing and controlling air distension of the dilating sacs.

(a) Fig. 1. (Photo A.)—A steel staff, round in cross section, sufficiently flexible yet strong, carries at its distal tip (a) a bougie of wedge type (Plum-

tical value: it permits the dilating sacs actually to engage the cardia, however tall the subject—something not possible with the short-staffed instruments sold over the counters in appliance shops. The distal end of the staff carries a metal spool-tube three fourths inches long and threaded for the reception of the wedge-shaped bougies. This tube also serves to anchor the stout

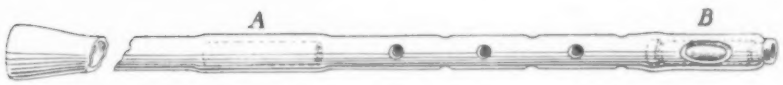

Fig. 1.

Fig. 2.

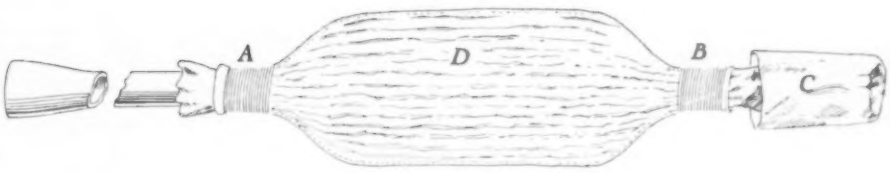

Fig. 3.

Fig. 4.

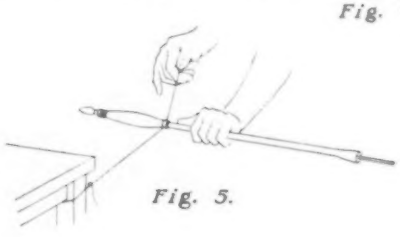

Fig. 5.

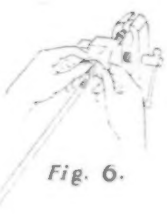

Fig. 6.

FIG. 2—Sketch T.

SKETCH 1. Rubber tube with perforations.

The details of the expansile section of the apparatus are shown in Fig. 2. The mode of adjusting the rubber bags and cloth retaining sacs is as follows:

(A) Metal Tube (B) Metal spool tube. Over these tubes (A & B) the Penrose tubing and cloth bag are fastened.

FIG. 2. Penrose tubing (C) fastened and tied over metal tube (A) and metal spool (B).

FIG. 3. The cloth bag (D) is slipped over Penrose tubing (C) and tied at (A and B, after which the Penrose tubing is cuffed over the cloth bag (D) and tied off at (A).

FIG. 4. Shows the complete dilator bag. (F) is a lead washer used to make joint with olive (G) air tight. (E) is a round metal staff to facilitate introduction.

FIG. 5. Showing method of fastening Penrose tubing (C) and cloth bag (D) to the rubber tube.

By anchoring one end of the silk the tieing of the bag and tubing is most satisfactorily accomplished.

FIG. 6. The metal staff is placed in rubber tube and the olive attached. Same is then held in a vice. The Penrose tubing is then grasped with both hands as shown and the tubing is cuffed over the cloth bag (D) and tied at (A).

rubber tubing, (b) perforated in its distal six inches, which encloses the steel staff, serves as an air conduit and receives the rubber and silk dilating bags (c). The rubber tubing has a diameter of 7/16 inches and is 29 inches long.

A special feature of the dilating bags is the material of which they are made and the ease with which they may be adjusted. We have attempted to do away with "special" sacs— expensive and difficult to secure— by using stock materials. ("Penrose" or ordinary "cigarette" drain rubber tubing.) The details of the sacs and the method of placing them in position are as follows:

(b) The air-inflation mechanism (Photo B)—This is joined to the dilating staff by a glass tube (d) 3 inches long and ¾ inch in diameter. Both distal and proximal ends of this glass tube are flanged in order to hold the rubber tubes snugly and prevent slipping and air loss.

From the proximal end of the connecting glass tube, a strong rubber tube, 28 inches in length and 1/4 inch in calibre, leads to a metal Y (e). This tubing is made of such length for convenience in handling the dilator when that has been introduced into the oesophagus. From one limb of the Y, a rubber tube 20 inches long passes to a pressure gauge (b) (U.S. Gauge Co.—No. A D—1444) of 15 lbs. registering capacity; small, yet adequate. From the second limb of the Y, a rubber tube 6 inches long passes to a hard rubber stop-cock (g). This is a "safety valve" in case, in emergency, rapid deflation of the dilating rubber sacs is desired and should the inflating bulb (h) fail to function. We consider this to be an important feature of the apparatus: its worth will be appreciated by those who have had experience with "hydrostatic" dilators whose whalebone staffs have become swollen by water and thus have prevented quick collapse of the dilating sacs and the prompt removal of the instrument from the esophagus of a distressed patient.

From the pressure gauge a rubber tube, 30 inches long, leads to a standard rubber bulb, of English make, similar to the bulbs used in the best form of blood pressure apparatus. This bulb has one way action, and has the usual screw type deflation valve.

The entire apparatus is quickly assembled, is compact, durable and practical. By actual use, we have found it far superior as a working apparatus, to any form of expansile, dilating, esophageal mechanism thus far available. Where one wishes to dilate stenoses under fluoroscopic control, the advantages of this "pneumatic" over the "hydrostatic" type of dilator are obvious: it can be used in X-ray rooms without water attachments, is quick, clean, positive and safe.

Gastric Manifestations in Constitutional Inadequacy*

By Arthur C. Clasen, M.D., *Kansas City, Mo.*

HIPPOCRATES was one of the first, who noted that body build and temperament were greatly affected by climatic conditions. He also observed in women a relationship between adiposity, menstrual disturbances, and sterility. In 1840 Addison[1] and Hutchinson[2] wrote descriptions of the types of people, who seem to be susceptible to certain maladies. They thought habitus or physical form of the individual bears an important relationship to disease. DiGiovanni[3] in 1880 developed a plan for anthropometric study of patients. He at first thought that it was the morphology that determined the character of the disease. Bean[4] in 1912 correlated observations on body-form and disease propensity. Draper[5] in exhaustive investigations classified man according to disease potentialities.

Goldthwait[6] recognized definite anatomic types that were present in chronic disease. He rarely found the normal type in the chronic patient. In his Shattuck lecture he made a plea for careful study of the anatomic type of patient, who was subject to disease. This plea has met only a limited response except for the efforts of a few workers.

In studying human constitution, we consider not only the morphological and functional characteristics but also those hereditary characteristics influenced more or less by environment. We must consider those qualities which are inherent in the germplasm and are passed from one generation to another through the physical agency of the chromosomes. Pende[7] defines constitution as a morphological, physiological, and psychological resultant of the properties of the body and of the combination of these in a special cellular state having a balance and functional output of its own, a given capacity for adaptation and a mode of reaction to its environmental stimuli. Julius Bauer[8] says that constitution represents an accumulation of potential energies, containing categories of special type, different from those of morphology and physiology. The primordium in the germ-plasm controlling body stature is a constitutional characteristic which may be noted in families as well as races.

It is our purpose in this paper to present our observations of a series of cases of constitutional imbalance or deficiency in which the chief complaints were symptoms referable to the gastro-intestinal tract. The more complete the balance, co-ordination and unification of body elements, the stronger

*Read before the Jackson County Medical Society, Kansas City, Missouri, October 20, 1929.

the constitution to exogenous causes. Any excess or deficiency of a part will impair the general dynamic equilibrium, and will represent a reason for constitutional weakness and disease. Viola's[9] studies showed that evolutionary disharmony between the two systems constitutes the primary natural reason for the deviation from the normal. In certain organs certain types of tissue may preponderate or may be deficient causing interstitial tissues to function imperfectly. The term "constitutional inadequacy" describes the physical or psychical imbalance of an individual, causing personal or environmental disharmony. In studying the constitution, we consider the morphological, the physiological, and the psychological aspect.

Under morphology we consider the relationship between the trunk and limbs. The broad type of build is called megalosplanchnic, hypoevolute or herbivorous; the long type of build is called microsplanchnic, hyperevolute or carnivorous. There may be local types out of harmony with general body habitus, such as a preponderance of cardiovascular, digestive, sexual or hemolymphopoietic systems. Clinically the morphological study of the development of each system is essential.

In the pure microsplanchnic, hyperevolute, or longitudinal type, there is a predominance of the thyroid alone, or of the thyroid, pituitary, and adrenal together, although mixed forms may occur; while in the megalosplanchnic there is a hypo-function of the thyroid, or of the thyroid and pituitary together.

Most important is the rôle of the sympathetic and parasympathetic systems. In sympathicotonia, an indication of constitutional hyperexcitability of the sympathetic system, we have tachycardia, spasm of arterioles, hypertension after emotion, with secretory and motor inhibition of the stomach and colon. In vagotonia or hyperexcitability of the parasympathetic system, we have hypersecretion, salivary, nasal, lachrymal, gastric and intestinal; hyperperistalsis, hyperchlorhydria, vomiting, localized spasm in the stomach and colon, habitual constipation, bradycardia, and hypotension.

The normal type of body has a normal inclination of the pelvis, normal elevation of the ribs, normal position of the shoulders; a torso of moderate length and of moderate breadth; thorax, full, moderately rounded, upper abdomen rounded; lumbar region shows a mild curve forward, the midlumbar area, inclination backward. The large bowel is adherent to the postabdominal wall on the right side up to the region of the liver, turns forward and inward crossing with a slight sag to the splenic flexure up in the left side of the abdomen behind the stomach from which point it is again attached to the peritoneal wall until it reaches the sigmoid. The transverse part of the colon is attached to the liver upon the right side and to the stomach in the center of the body. The stomach and liver are attached to the diaphragm and the suspensory ligament of the diaphragm is the pericardium which is attached to the anterior part of the lower cervical spine. In the upper abdomen, lies the aortic plexus, and the ganglia so placed that when the organs are in their proper

position, there is the least possible pressure on them.

In the megalosplanchnic, (Case 1) the stature is medium or below medium, with excess body mass, horizontal diameters greater than longitudinal; large head, premature baldness, face broad or pentagonal; abdomen, larger than trunk, upper abdomen, larger than lower with umbilicus low; skin, tough and oily; stomach, short, horizontal type; large bowel, long and of large caliber. The endocrine system may show an atonic, flaccid type, such as a hypothyroid variety, characterized by vagotonia in which there is a tendency to constipation, migraine, articular pains, asthenia, and somnolence after meals. Individuals are slow in movement and in psychic reaction. The nervous system is sensitive, the individuals are moody, possess a low blood pressure, and have great tolerance for sugar.

Disturbance in posture due to large and heavy viscera causes backward inclination at the hips. Imperfect action of the liver or the formation of gall stones may be influenced by mechanical interference with the structures upon which function depends. Proper mechanistic and anatomic considerations should be given to these abdominal conditions. The inability of the stomach to empty or the variations in character of its secretions may be due to the position of the organ or to disturbance in the nerves or blood vessels.

Microsplanchnics (Case 2) show a tendency toward gastro-intestinal dyspepsias and splanchnoptosis, pernicious anemia, ulcers of the stomach and duodenum, intestinal disorders, tuberculosis and nervous disturbances (Case 7). There is a deficiency development of the system that assimilates energy and accelerates metabolism, hence these individuals are thin. The digestive apparatus shows an atonic and ptosed stomach. These individuals possess a voracious appetite, but are unable to put on weight. They have high acid values, good peristalsis, and rapid emptying rate. The stomach is long and tubular, attachments are less firm, and downward displacement is greater when standing. The small bowel is shorter, walls are thinner and lumen smaller. The mesentery is longer and in standing the small bowel lies in the upper pelvis or lower abdomen. The large intestine is shorter and more mobile. On the right side, there is a free mesentery, permitting this portion to change its position easily. The left side has a mesentery so that in the upright position, the entire colon lies below the crest of the ileum. On account of the absence of the retroperitoneal fat the vessels and nerves lying on the spine are constantly irritated; the same with the adrenals, which are unprotected by fat pads, permitting mechanical interference to take place. The loosely attached organs drag backward; and thus in the reclining position they may cause subnormal temperature, low blood pressure, and general lack of vitality. Oftimes the diaphragm is depressed and the abdominal wall is relaxed with lessened support of the wall which forces the organs downward. Careful study of the maladjustments of the parts or study of posture often gives one a clue to correction of pathological changes in the abdomen.

There are two functional types of gastric constitution: hyperasthenic and the asthenic. The hyperasthenic stomach is characteristic of the megalosplanchnic. They have a large stomach; large capacity for food; eat slowly due to the tone of the stomach and esophagus. In this type the stomach and esophagus dilate slowly. The asthenic type is characteristic of the microsplanchnic. Due to poor tonus, the stomach is always open, fills easily, hence food passes rapidly. In megalosplanchnics, the amount of secretion is large and in microsplanchnics, diminished, so in megalosplanchnics, large amounts of water are necessary to dilute the gastric juices.

The exact function of the vagus, sympathetic, and intrinsic nervous formations of the stomach relative to tonicity and peristaltic functions are still unknown. Bickle[10] states that the vagus and sympathetic have both stimulating and inhibitory fibers. The vagus acts more on the pyloric sphincter, antrum and pars media, and the sympathetic acts on the fundus and cardia. When the fundus and cardia contract, the other parts relax and vice versa. Eppinger and Hess[11] found in vagotonics, hypertonia of the sphincter and of the pylorus, hence the bull's horn type of stomach, where the stomach fills slowly, producing heart symptoms due to raising of the diaphragm. The sensory disturbances are burning, pain, sense of acidity in the throat, not due to excessive acid but to vagal hyperesthesia of the gastro-esophageal mucosa or to muscle irritability.[12]

Ulcer is prone to occur in the hypertonic area along the lesser curvature, where food irritates it. This part is more spastic hence it favors obstruction of the small blood vessels. Food also remains longer in the stomach, emptying is slower and acid chyme remains longer in contact with the ischemic mucosa, producing a tendency to ulcer formation. Some types of ulcer must be considered as constitutional, a true trophic neurosis of the gastric or duodenal wall, not the same as a constitutional neurosis of the stomach. Ulcer generally attacks individuals with a weak stomach, who have suffered for years from dyspeptic disturbances, and who have stigmata of hyperirritability of the vagus. These patients often correspond to the asthenic, microsplanchnic type with hyperthyroidism and hyperadrenalism. (Case 5).

Relative to the secretory insufficiency, achylia or hypochylia, complete or partial, there is a degenerative stigma occurring often in several members of the same family, often associated with neuropathic diathesis, along with geographic tongue, perverted appetite, constitutional albuminuria, constitutional bradycardia, and various endocrine anomalies, such as hyperthyroidism, goiter, and diabetes. As the cause of secretory anomaly, we find protopathic weakness of the secretory cells, and constitutional vagal hypotonia.

Achylia is often associated with gastric hyperperistalsis, and in the presence of a permanent opening of the pylorus, secondary intestinal disorders, as diarrhea arise. Sometimes states of achyiia and hyper-secretion or of hyperchlorhydria alternate in the same subject. This is common in endocrine dyscrasias as hyperthyroidism and hypoparathyroidism. It is probable that a constitutional gastric sympathicotonia predisposes to such secretory changes.

Gastric hypotonia is due to a constitutional sympathicotonia. The preponderant tonus of the sympathetic is associated with a condition of diminished tonic contraction of the pylorus, and hence with a more ready emptying of the stomach.

In megalosplanchnics we have a long, large bowel causing the fecal matter to be dry and fully formed; of importance in habitual constipation. Microsplanchnics have short, small intestines which make only partial use of the alimentary material, so that a part of this is subject to decomposition by the bacterial flora in the large bowel, or to elimination in the form of copious, semifluid feces. We often find intestinal disturbances in subjects with exudative, lymphatic, neuroarthritic or vagotonic diathesis on account of the extensive, reticulated lymphatic tissue (Case 10). These disturbances are paroxysmal phenomena often resembling anaphylactic crises.

In exudative diathesis, occurring in childhood, there are anomalies of metabolism (Case 10). The infantile type is characterized by marked development of connective and lymphatic tissues, by preponderence of tonus of excito-anabolic nerves, parasympathetic and vaso-dilators, and preponderance of certain hormones in the endocrine balance such as thymus and pineal over the less-evolved functionally, as pituitary, adrenal, and genital hormones. These patients have urticaria, protein-shock, and anaphylaxis.

Enteroptosis has a deleterious influence upon the respiratory and circulatory system. Lack of support of the diaphragm results in suppression of the diaphragmatic lower costal respiration. Here the auxiliary respiratory muscles, act and lift up the upper half of the thorax; the base being restricted. Intra-abdominal blood not being subjected to the normal inspiratory pressure accumulates in the abdominal viscera, especially in the liver, producing a congestion of the abdominal vessels, hemorrhoids, and renal stasis, and an ischemia of the upper half of the body, with resultant faintness and dizziness.

Certain individuals have the characteristics of the bilious temperament. Familial simple cholemia is a hereditary anomaly of bile production and secretory function of the liver. Here there is a small amount of bilirubin circulating in the blood stream. These individuals are disposed to acquire gall stones, infectious icterus, and primary cancer.

Microsplanchnics of the hyperthyroid, hypoadrenal type, often are descendants of gouty or diabetic individuals. This constitutional hyperbilirubinemia is not due to disturbances of the biliary system, but probably due to insufficient function of hepatic cells, which do not convey all the bile pigments into the bile ducts.

Chauffard[13] assumes an incapacity of the hepatic cell to transform the cholesterin of the blood and to eliminate it in the bile. He found that cholesterinemia, which often is hereditary, is present in individuals of the arthritic family, which very often possess biliary calculi. Cholesterin metabolism is governed by certain endocrine tissues such as adrenal cortex, corpus luteum, interstitial glands, thymus, and anterior-lobe pituitary, therefore it is readily understood why gall bladder cases have a characteristic facies.

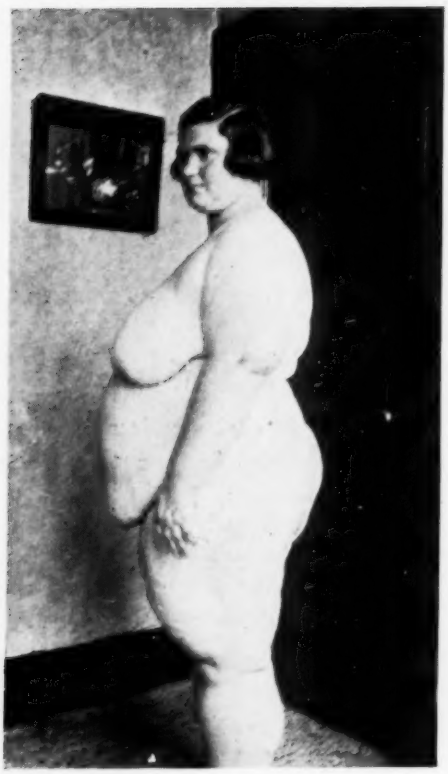

FIG. 1—Case 1

FIG. 2—Case 2

CASE 1. Mrs. S. Megalosplanchnic or broad type (note proportion between the transverse and longitudinal diameters). Massive pendulous abdomen that causes drag, with resultant backward inclination of spne and producing disturbance in function of the abdominal organs. The chronic constipation cleared up when dietary, mechanical, and repeated exercises for the abdominal muscles were instituted.

CASE 2. Microsplanchnic or long type. Miss D. Age 35. Weight 96. Height 169 cm.

Chief complaint: Periodic attacks of epigastric heaviness, with nausea and vomiting after meals, of many years duration, not influenced by diet or alkali. Previous diagnosis, ulcus stomach.

Physical examination: Dolichomorphic type; lordosis; gastroptosis; enteroptosis; metabolism, plus 11.

Fractional gastric showed no free, and but 12 total acid, at the end of one hour.

On a program of forced diet with abdominal exercises, and support, she has gained 24½ pounds, and has been symptom free for a period of 4 months. This case illustrates the importance of the study of constitutional make-up in evaluating symptoms.

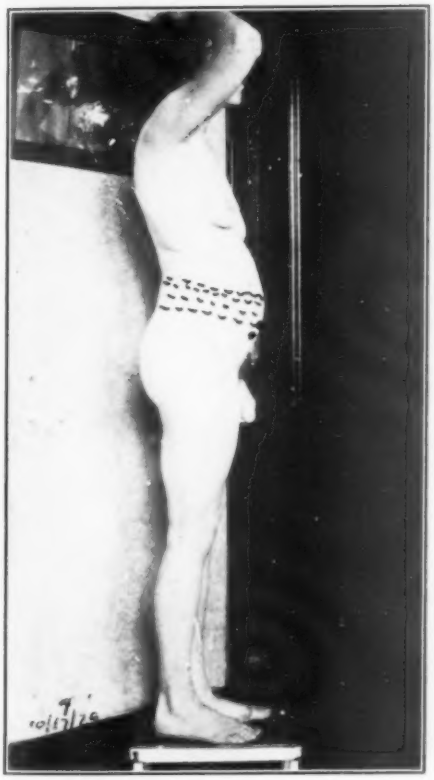

FIG. 3—Case 3 B right

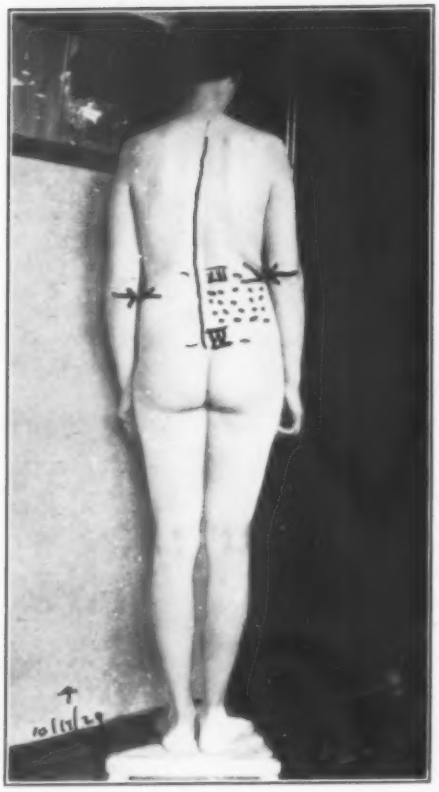

FIG. 4—Case 3 A left

CASE 3. Mrs. A. Chief complaint: Profund constipation, abdominal distention, nausea with occasional vomiting, melancholia, nervousness, irritability.

Physical examination: Dorsal and lumbar scoliosis; left pelvis one inch shorter than right; pendulous abdomen with mass in left lower abdomen, which disappeared under bowel therapy; marked anterior curve of lumbar spine; skin hyperesthesia, 10th dorsal to 3rd lumbar area, bilateral.

Constipation and gastro-intestinal symptoms cleared up following mechanical correction of the anatomic disturbance together with dietary management and proper exercises for the spine and abdominal muscles.

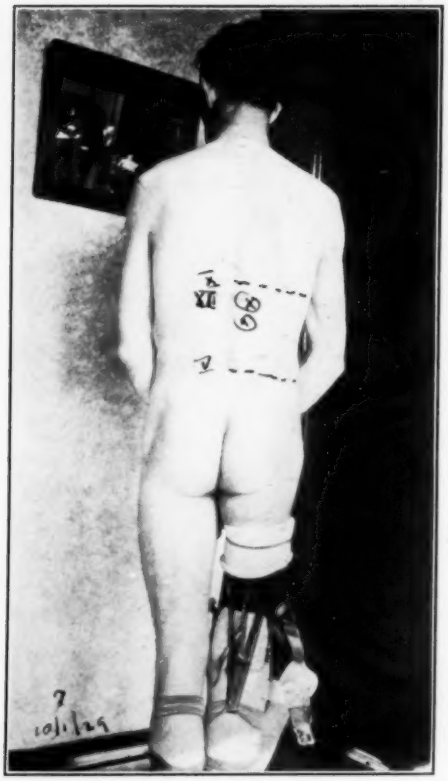

FIG. 5—Case 4 A left

FIG. 6—Case 4 B right

CASE 4. Mr. P. O. Chief complaint: Indigestion, epigastric pains of years' duration; periodic, seasonal, rhythmical; pain occurs two hours after meals, relieved by food or soda bicarbonate, but reappears one-half hour later; pain constant, localized, non-radiating in character.

Physical examination: Normal type with hypothyroidism and with amputation of right leg below knee, producing a mechanical disturbance in posture when walking. Definite skin hyperesthesia 10th dorsal to 5th lumber with pressure zone, same segments, right side.

X-Ray diagnosis, ulcus duodeni, lesser curvature. Fractional gastric analysis showed marked hyperacidity with occult blood present.

Symptoms subsided upon correction of mechanical disturbance in addition to alkali therapy. It is worthy of note that the above symptoms on former occasions did not respond to alkali therapy.

Fig. 7—Case 5

Case 5. P. H. Chief complaint: Epigastric discomfort, nausea, pain and vomiting, after meals, periodical, rhythmical, definite.

Physical: Dolichomorphic type with hyperthyroidism, associated with hyperadrenalism, no focal infection found.

X-Ray: Ulcus duodeni and ulcus gastrica, lesser curvature.

Fractional gastric; hypersecretion and hyperchlorhydria.

Progress: Temporary response to atropine and alkali-therapy and dietary management. Definite response to non-specific protein therapy, calcium, and parathyroid and sedatives.

Remarks: This case clearly indicates the role of the thyroid and adrenal type of constitution in producing gastrict manifestation. It is this type of ulcer case that does not respond to medical or surgical ulcus therapy, unless attention be directed to the endocrine glands.

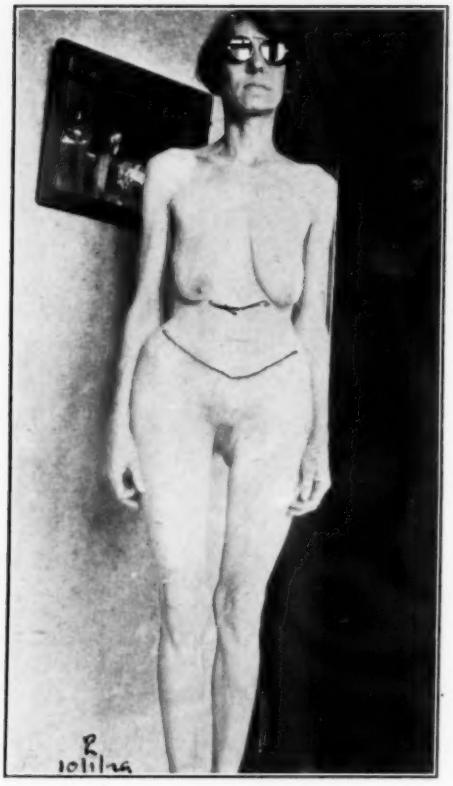

FIG. 8—Case 6 A left

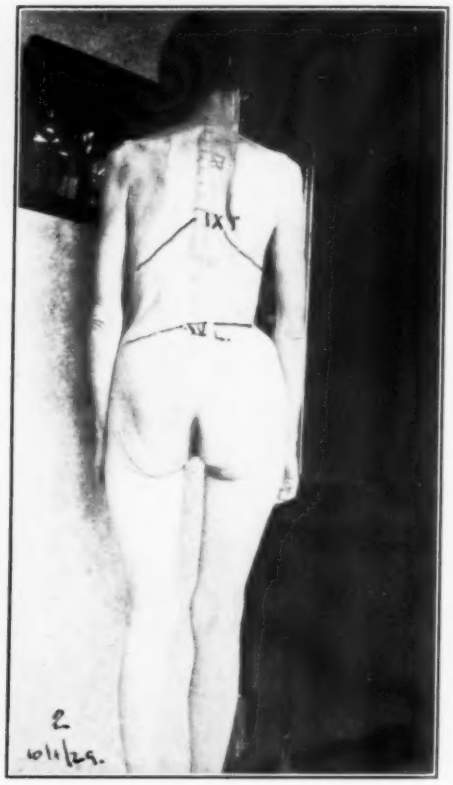

FIG. 9—Case 6 B right

CASE 6. Mrs. T. Age 39. Chief complaint: Loss of weight, weakness, nausea, vomiting, periodic, several years' duration, vomiting one-half to one hour after meals, has been constant for four months.

Physical: Microsplanchnic type, emaciated with definite skeletal deformity, producing definite change in size and shape of abdominal cavity. An example of the influence of a skeletal deformity in producing gastric symptoms.

Skin hyperesthesia from 9th thoracic to 4th lumbar segment.

Laboratory tests negative, no evidence of lues.

Progress, symptoms abated under exercise, diet and proper mechanical support. Patient gained 20 pounds and is symptom free.

FIG. 10—Case 7

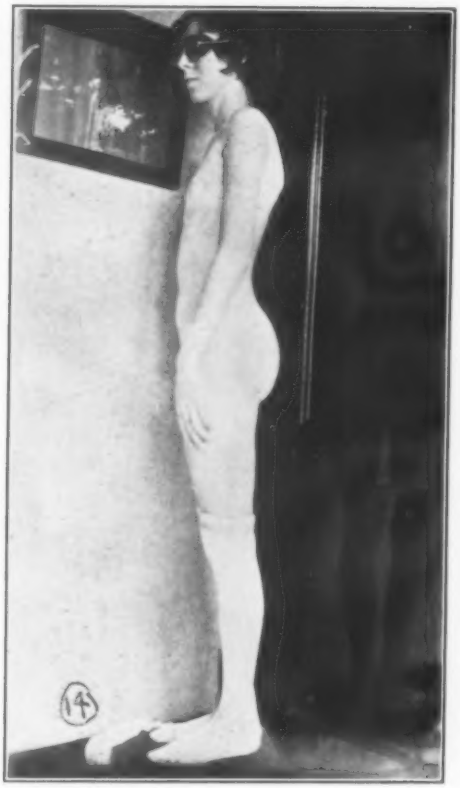

FIG. 11—Case 8

CASE 7. Mrs. H. Dolichomorphic type with hyperpituitarism and hyperthyroidism.

Chief complaint: Indigestion; loss in weight; severe constipation; gaseous distention.

Physical examination: Tall, emaciated, individual, flat chest; dorsal kyphosis with accentuated anterior lumbar curvature (note faulty posture).

R-Ray plate chest positive for active tuberculosis. Stomach lies on floor of pelvis.

Fractional gastric analysis shows an achylia.

Under a program of forced feeding, rest and abdominal support, patient gained weight and was free from symptoms. Pulmonary tuberculosis causing gastric symptoms is not uncommon in this constitutional type. Correction of the postural deformity by abdominal support, which increased intra-abdominal tension, often gives smyptomatic relief.

CASE 8. Miss R. Age 19. Weight 91 pounds. Infantile type of constitution associated with hyperthyroidism.

Chief complaint: Pain entire right side of abdomen, six months' duration.

Physical examination: Infantile type; small bones, flat chest, dorsal kyphosis with anterior curvature of lumbar area.

Patient gained weight and was symptom free under a program of forced feeding, rest, Lugol's solution, quartz-light and abdominal support. This type seems to respond when the intra-abdominal tension is increased by increased abdominal fat and by a mechanical support.

FIG. 12—Case 9

FIG. 13—Case 10

CASE 9. Mrs. F. Chief complaint was burning in the epigastrium, with a hungry feeling, she was unable to satisfy.

This case illustrates the mechanistic factor and its relationship to constitutional skeletal deformity, in this case a bilateral dislocation of both femurs. The postural deformity probably caused pressure on the vascular supply or in the ganglia. Abdominal support partially remedies her postural deformity, bringing about relief of her gastric disturbance. Wassermann 4+ positive. Specific measures instituted.

CASE 10. A. C. Chief complaint: Incontinence of urine and feces since birth; obesity; incorrigible.

Physical examination: Typical example of exudative diathesis in childhood. Age 5; weight, 82 pounds; height, 45 inches (normal 43 pounds, 45 inches).

Past medical history: Unable to sit upright until two years of age, and only then, after intensive x-ray therapy over thymus.

Obese, undescended testes, small penis. Patient very difficult to manage, very sensitive to external stimuli.

Progress: Incontinence of urine and feces cleared up under pituitrin and thyroid medication.

This case illustrates the role played by the endocrines in constitutional inadequacy.

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Agranulocytosis

By William Henry Gordon, M.D., *Detroit, Michigan*

AGRANULOCYTOSIS, Agranulocytic Angina or Malignant Neutropenia was first described in full in the German literature by W. Schultz in 1922. Since this report a total of about eighty papers have been written describing this condition. The first appearance in American literature was in the paper of W. A. Moore and H. S. Wieder in the Journal of the American Medical Association, August 1925.

Schilling says: "the term 'agranulocytosis' has come into the nomenclature on account of its brevity. It is incorrect: the name of 'Agranulocytes' was originally chosen for 'neutrophiles without granulations' of leukaemias. By 'Agranulocytosis' is meant an increase in these atypical neutrophiles, which is not intended." He therefore calls the disease "Malignant Neutropenia."

This condition may be a definite disease entity; or the result of (a) a chemical poisoning or (b) some chronic disease, diseases or infections. It can be defined as a very severe ulcerative angina, usually manifested by signs of an acute infection and associated with marked prostration, extreme leukopenia with lack of granulocytes.

The etiology at present is unknown. Some observers believe it to be a chronic Vincent's Angina. Others believe it to be a very severe sepsis in which Vincent's spirillum is only a laboratory finding; still others believe it to be the complication of a long protracted illness such as hypertension and chronic gall bladder disease. A few believe it to be the result of poisoning by chemicals after treatment with some drug of the benzene ring series. Many think it to be a new disease. It occurs in both males and females. The youngest case on record, that of N. Christof's, was 2 weeks old and the oldest, herein reported, was 66 years of age. About 90 per cent of the reported cases have been females. David believes the blood picture due to a defect of the cell distribution and not to faulty formation. Skiles believes "it may be a specific infection in the gangrenous areas which secretes a specific toxin against the granulocytes," or "it may be a primary infection of the bone marrow resulting in a drop in the formation of granulocytes with a lowering of resistance of the patient. This might make the patient subject to any intercurrent infection, with resulting necrosis and death."

Another observer thinks that there is some injury to the reticuloendothelial cells of the liver. Hirsch stresses the point that "it is certain that it is not of tonsillar origin, for many times the tonsils become infected some time after the beginning stage and occasionally do not become involved at all."

Case No. 3 had had tonsils well removed. Schultz: "It may be assumed that the affection involves an extensive injury of the spinal cord in the domain of the granulocytic system, caused by infection."

Several authors have attributed the disease to bacterial origin. Lovett reproduced the disease in guinea pig with bacillus pyocyaneus. Many of the reported cases had positive blood culture to streptococcus and staphylococcus. Hill's case occurred in a woman of 35 years of age and started after extraction of a tooth the smear of which showed Vincent's and other organisms. Several cases have been reported after the removal of very severely infected teeth with positive smears to streptococcus and Vincent's (Vos).

Edith Peritz's case and cases No. 2 and No. 3 of this paper were being studied in the hospital for gall bladder disease when they suddenly developed all the signs of an acute head cold and this was very quickly followed by the typical picture of the disease.

Many cases have been sent to the hospital for diphtheria and upon a study they have had negative cultures with all the signs of this disease and the diagnosis has been made by white blood count and also at autopsy. (Zikowsky).

Pathology: The mucous membranes throughout (tongue, throat, tonsils, larynx, pharynx, vagina, rectum and whole intestinal tract) have huge ulcerative areas. (These differ from ordinary ulcerative diseases in that microscopic section shows the usual inflammatory reaction at the border of the lesion to be absent.) The liver, spleen and lymph glands may be slightly enlarged or unchanged. Section of them shows nothing of importance. The bone marrow is liquid and is anything from a straw color to an intense red. It contains few cells. There is marked absence of granular cells and a definite granulocytic aplasia of the bone marrow. It contains many plasma cells and lymphocytes (Schilling). One case reported by George J. Kastlin showed endothelial hyperplasia in spleen, lymph nodes and bone marrow. Some cases showed skin lesions, others showed petechial hemorrhages late. In the study of the bone marrow the work of Zadek, Schultz and Jacobwitz is very important. They removed bone marrow from the sternum during the height of the disease. These specimens were cell poor and were very similar to the marrow at autopsy, that is they contained no granulocytic elements. This work was repeated by Robert W. Buck in his case of "Agranulocytosis with Anal Ulcer" reported in the J. A. M. A., November 9, 1929. He removed section specimens of bone marrow in his study of the case before it came to autopsy.

There is an increase in the reticuloendothelial cells of the bone marrow, spleen and circulating blood. These cells contained small oxydase granules which have been attributed by Hirschfeld to degenerative changes.

Symptoms: The patient may be perfectly well or under the care of his physician for some chronic disease. K. Tokue and M. Yasumato were treating a child 4 years old for fracture of the skull when he developed the disease. Hunter's case was under treatment for fracture of the tibia. Ehrmann and Preuss were investigating

the etiology of jaundice in their case. Leon Bromberg and Paul Murphy had given prophylactic typhoid vaccine and Bantz's patient had tuberculous arthritis when he developed the disease. Suddenly while at home or in the hospital a patient may develop all the acute symptoms of cold, i.e. high fever, chills, severe sore throat and coryza, and within 24 to 48 hours usually but even after several days the patient has dysphagia, ulcerative then gangrenous stomatitis, swelling of the neck at the angle of the jaw, malaise, marked toxicity and prostration. Icterus occurs in over 50 per cent of the cases. Lauter observed that "the height of the disease occurred on the day gangrene appeared in the mouth." Liver, spleen, and lymph glands may be normal in size. Often the lymph glands are enlarged. The toxic symptoms become much worse and are followed by delirium and death.

Laboratory Data: If a blood count is taken early in the disease it may be normal in every manner. The platelet count is normal. The coagulation and bleeding time has been normal except in one case reported by Kastlin. The hemoglobin, and red blood cells have been normal in the majority of the cases. Zadek reported two cases with 29 and 49 per cent hemoglobin, respectively. The white blood count has been the interesting and diagnostic factor. It has been low in all cases and gradually decreased to nothing if the disease proved fatal. The granulocytes became less and less and the lymphocytes relatively increased.

In the few cases which have recovered the white count returned gradually to normal. These cases upon careful cytologic study of the leukocytes showed early in their course an increase in the large monocytes over 14 to 20 per cent. They also showed a Schilling index which had an early increase in the myelocytes and young cells. These latter laboratory procedures have been of value in determining the prognosis.

The course of the disease is usually acute and very rapid. A few cases have lived weeks and months. The prostration and ulceration shows marked progress from morning to night. The white blood count and differential shows definite change from hour to hour. It absolutely disappears in the majority of cases before death. A few cases recover or have remissions.

The prognosis is usually fatal after a very acute onset and course. The lesions spread rapidly. Those few cases which have recovered show the high per cent of monocytes and the Schilling shift early as mentioned in the laboratory study.

Differential Diagnosis: The disease must be differentiated from Pernicious Anemia (Biermer's Anemia), Severe Secondary Anemia, Aleukemic Leukemia, Monocytosis, Sepsis, Kala Azar, Noma, Diphtheria and Black Diphtheria, Vincent's Angina, Aplastic Anemia and Thrombocytopenic Purpura. It is diagnosed from:

(1) Pernicious Anemia by the extreme prostration, angina and the absence of the typical blood picture of a low red blood count, high color index and usually normal white blood count.

(2) Severe Secondary Anemia by the history, and the absence of the blood picture of a uniform definite de-

crease in both red and white blood cells with a normal differential.

(3) Aleukemic Leukemia by the blood picture and symptoms and absence of generalized increasing enlargement of the lymph glands.

(4) Monocytosis by the decreased instead of increased white blood cell count with predominance of monocytic cells.

(5) Sepsis by history, physical findings and blood picture.

(6) Kala-Azar as the latter is common only in Asia and Soudan and by the lack of large spleen, length of irregular fever, progressive anemia and cachexia, and in Kala-Azar spleen puncture shows Leishman-Donovan bodies.

(7) Noma by ulceration of mucous membranes of mouth without change in blood picture.

(8) Diphtheria and Black Diphtheria by absence of Klebs-Loeffler bacillus.

(9) Vincent's Angina by absence of fusiform bacillus and spirillum in sufficient numbers.

(10) Aplastic Anemia by history of some cause as Salvarsan treatment, etc.

(11) Thrombocytopenic Purpura by absence of a large spleen, low platelet count and not typical picture.

The disease may occur in conjunction with some of the above, as William Allen reported a case of Agranulocytic Angina with Thrombocytopenic Purpura.

The diagnosis is made by history, onset and course of the disease and finally by the white blood count with lack of granulocytes.

In the treatment of the disease many drugs and types of therapy have been tried. The following: Omnadin, Neosalvarsan, Iron, Arsenic, Liver, bone marrow, various nuclein extracts (such as nucleinic acid and leukocytic extract), streptococcus serum, intravenous medication with foreign proteins (especially typhoid), x-ray to spleen and long bones, ordinary blood transfusion and blood transfusion from a cured case have been suggested. One case reported by Finnegan was helped by transfusion. Otto Hoche used blood transfusion in three cases one of which recovered. Hart has had no results with the treatment and believes the disease to be hopeless. Freedman reports four cases as cured by x-ray therapy. No cases have been helped by arsenic or mercurochrome. One case was helped by typhoid vaccine intravenously. Two cases (including case No. 3, this paper) were helped and possibly cured (too early to give absolute report) by daily injections of nucleinic acid.

The four cases which I wish to present are:

Case No. 1—E.B.:

Age 36. Female. Unmarried. Stenographer. Born in Saginaw. Has been under my care since January 23, 1925, for Lues. During this time she has had several courses of neo-salvarsan, bismuth and mercury, the last course having ended in December, 1926. Patient gives a negative *family* history. *Past history* negative with the exception of lues. (Patient has a loose moral character). *Menstrual history* negative.

Present Illness—On September 18, 1928, she came to the office because of right sided sore throat and pain in the ear (drum membrane was congested), and was diagnosed right tonsillitis (early quinsy) and right otitis media. On September 21, 1929, I saw

CASE NO. 1

HARPER HOSPITAL

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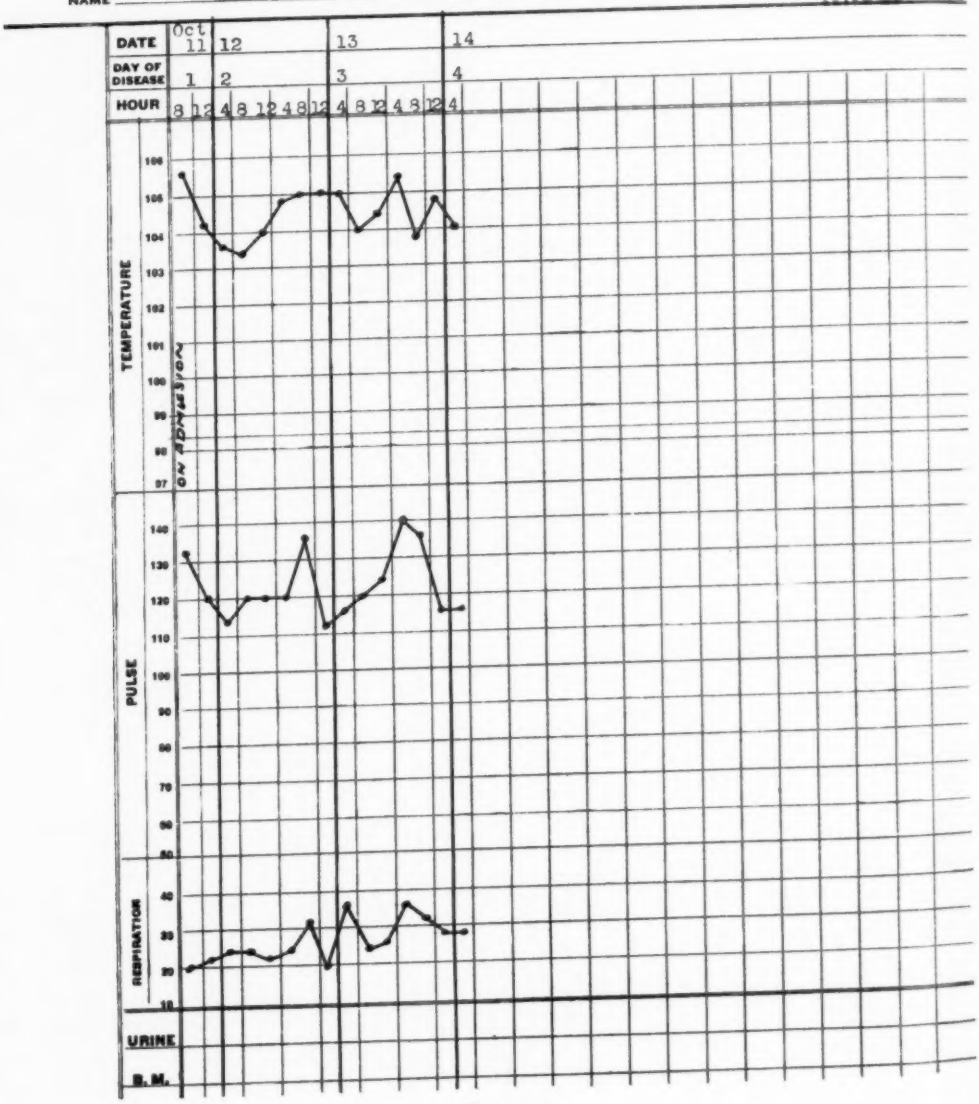

CHART I

her at her home and she had a membrane over both tonsils and was given 10,000 units of diphtheria antitoxin (Culture taken at that time was returned negative). September 22, she was given 20,000 units more and a second culture was reported negative. September 23, the left tonsils appeared healed but the right tonsil ulcer was not healed and appeared to be punched out and contained a gray slough. A question of tertiary lues was brought up and she was given 50 mg. of bismuth hydroxide intravenously. The ulcer began to heal and did heal by September 30, 1928.

On October 9, 1928, patient came to the office because of painful and swollen glands in the neck at the angle of the jaw. Her temperature was 105. W.B.C. was 800, all lymphocytes. A direct smear showed staph. and strept. and her soft palate and tonsils showed severe ulceration with a grayish membrane. She was sent to the hospital and entered October 11, 1928, with a chief complaint of severe sore throat, difficulty in swallowing and respiratory embarrassment. On entrance to the hospital the following note was made: Patient had swelling of the neck and jaw especially at angle of jaws with a flushed facies and her skin showed a peculiar yellowish icteric tinge. She appeared very ill but was rational and was very reticent and non-co-operative. Her right tonsil area was replaced by ulceration and covered by a gray-green exudate and was surrounded by considerable edema of the fauces, pharynx and epiglottis. Left side was covered by the same exudate, was reddened and edematous. The infllamed areas were acutely tender and there was swelling of the right submaxillary region which extended over the entire lower jaw and especially at the angles and progressed up to the time of demise. The swollen area was not fluctuant. The vagina showed ulcers.

The Laboratory Data:

May, 1928 W.B.C. 7500; Hgb. 90%; R.B.C. 4,800,000. Normal Diff. Wasserman 4 plus. Kahn 4 plus.

Oct., 11, 1928 W.B.C. 800, all lymph. *Oct.* 12, 1928 W.B.C. 300, all lymph. R.B.C. 3, 140,000; Hgb. 50%. *Oct.* 14, 1928 W.B.C. 300, all lymph. Urine neg. at all examinations. Temperature ranged from 103 to 140. Resp. 28 to 40. Blood pressure 100/70. moist râles were heard at both bases of lungs. Otherwise findings were negative.

Patient *died* at 1:45 P.M., *Oct.* 14, 1928.

Case No. 2—Mrs. H.H.:

Age 66. Female. Married. Housewife. Born in Elk Rapids, Mich. Has been under care for 3½ years for hypertension, chronic cholecystitis and myocarditis. *Family history* negative except 2 sisters died of cancer. *Menstrual history*—Menopause at 50 by hysterectomy. Patient married at 27 years, never pregnant. Husband living and well. *Past history*—Has always been ill. Operated in 1910 for hysterectomy, appendectomy and hemorrhoidectomy. Has been deaf for 28 years. In October, 1926, was jaundiced with swelling of the legs and tender gall bladder. In November, 1926, had a left otitis media and influenza.

Her positive examination before present illness showed: blood pressure 160 to 224 over 70 to 110. Pulse 96. Nerve deafness both ears. Pale conjunctivae. Arcus senilis. Septic tonsils. Upper and lower plates excepting the upper front. Neck negative. Heart enlarged, distant sounds, presystolic murmur at apex not transmitted. Abdomen: midline scar from umbilicus to pubis. Liver enlarged 2 f.b. below c.m. and tenderness in R.U.Q. Reflexes normal. Rectum negative. Gynecological: No uterus, no cervix.

Urine showed albumin on several examinations. Blood chemistry normal. Wasserman negative. R.B.C. 4,300,000; W.B.C. 7500; Hgb. 75%; Differential normal. G.I. examination showed chronic cholecystitis. Our diagnosis was chronic cholecystitis, myocarditis and hypertension. During all my observations this patient always complained of stomach trouble and frequent colds.

In February, 1929, patient had a lower right third molar removed and following this had a severe attack of gall bladder pain accompanied by dizziness. Pain in R.U.Q. She also had high blood pressure with distress in the abdomen and chest. This was accompanied by frequent sore throats. As patient lived in Pontiac and the attacks were becoming more frequent I advised her

CASE NO. 2

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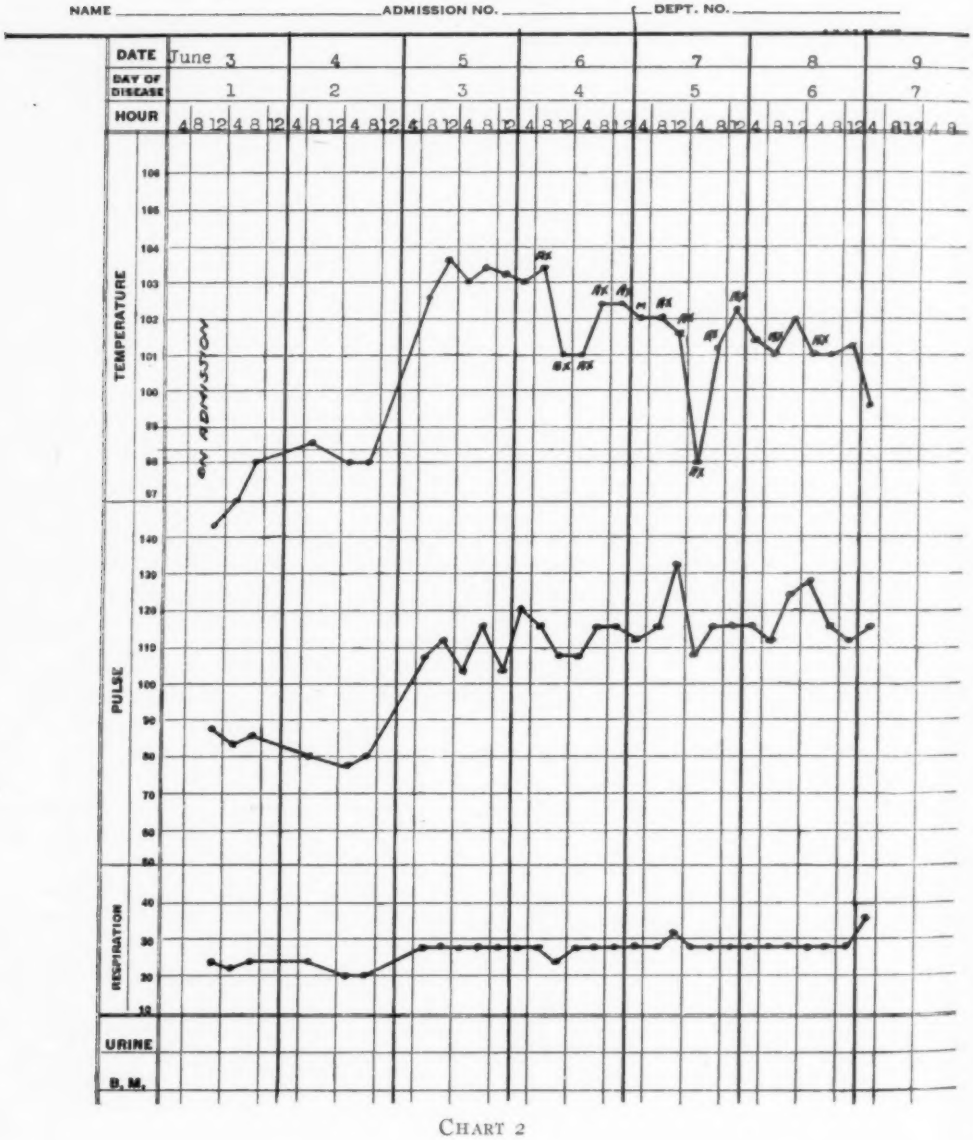

CHART 2

to enter the hospital here which she did June 3, 1929.

On entrance to the hospital she had: R.B.C. 4,280,000; W.B.C. 3200; Differential: 100 lymph. C.I. 93. On June 4, patient developed a severe sore throat, with coryza and marked prostration. The nasopharynx and palate were a dry dull red color. With this she showed a progressive decrease in the W.B.C. with a relative increase in the lymphocytes, and absence of granulocytes. Also progressive ulceration of the throat, tonsils, nasopharynx and larynx and uvula. She also had difficulty in swallowing and talking. Her temperature went to 104, pulse 40 and respirations 40.

Laboratory Data: (June, 1929).

June 4, Hgb. 70%; R.B.C. 4,280,000; W.B.C. 3,200; all lymph. C.I. 83.

June 5, 10:45 P.M.: W.B.C. 1300; 25 cells counted, all lymph

June 6, A.M.: Hgb. 70%: R.B.C. 3, 490,-000; W.B.C. 1350, 20 cells, all lymph.

June 6, 5:30 P.M.: W.B.C. 700; 30 cells found, all lymph.

June 7, 9 A.M.: W.B.C. 800; 10 cells found, all lymph.

June 7, 9:30 A.M.: 25,000,000 typhoid bacilli injected intravenously.

June 7, 10:30 A.M.: W.B.C. 700, cells all lymph.

June 7, 11:30 A.M.: Post typhoid chill.

June 7, 12:15 P.M.: W.B.C. 650, all lymph.

June 7, 7:30 P.M.: W.B.C. 600, all lymph.

June 7, 9:45 P.M.: Given 315 c.c. citrate blood.

June 8, 9 A.M.: W.B.C. 500 cells, all lymph. Given 5 cc. leukocytic extract.

June 8, 11 A.M.: W.B.C. 650 cells, all lymph.

June 8, 7 P.M.: W.B.C. 500 cells, all lymph.

June 9, 9:20 A.M.: Died.

Urine showed 2 plus albumin, otherwise negative. Stools neg. NCN 30 B.S. 125. Wasserman negative.

Postmorten examination was made of Case No. 2 with the following positive findings: Generalized ulceration of the tonsils, soft palate, nasopharynx and larynx. Areas of ulceration in the stomach, ileum, jejunum and colon, also rectum. Also ulcers in the vagina. Marked swelling of the neck at the angle of the jaw down. Atrophy of the bone marrow which was a pale straw color and contained no cells upon microscopic study. Chronic myocarditis, cholecystitis, hepatitis, and nephritis.

Case No. 3—Mrs. O.W.

Age 33. Female, Born in Indiana. Lived in Detroit for past 5 years. *Family history* negative. *Menstrual history negative.* Married 9 years, 2 children, ages 6 and 2 years, living and well. Husband living and well. No miscarriages. *Past history*—Usual childhood diseases. Hysterectomy, appendectomy, perineorrhaphy. Has had cholecystitis for 6 years, also chronic accessory sinus diseases. Patient was admitted to Harper Hospital for study of her gall bladder and sinuses. She was to have the sinuses treated and probably a submucous operation, when she developed a severe cold with a sore throat and was sent home to recuperate on November 18, 1929, without any operative therapeusis. Her physical examination while in the hospital was negative except for the following: Blood pressure 108/70. Tenderness over all accessory sinuses. Slight tenderness and muscle spasm in right upper quadrant and epigastric region, and pharyngitis. Her laboratory data was: 11-12-24: Hgb. 70%; R.B.C. 4,400,000; W.B.C. 8400; P. 74, L. 20, M. 4, E. 2, R.B.C. normal. 11-11-29 Urine negative. 11-12-29: P.S.P. test: 1st. 15 min, 60%, 2d. 30 min. 20%, 3d. 60 min. 10%, total 90%. 11-12-29: Duodenal drainage 275 c.c. clear greenish amber fluid, no w.b.c. or bacteria seen. NCN 40 mgs. Sugar 0.090%. Iceteric Index 10. Van den Bergh's: Direct and Indirect slightly positive. X-Ray: dorsal and lumbosacral spine shows a lumbarization of the first sacral segment and evidence of irritative changes about the left sacroiliac synchondrosis. 8-27-29 X-ray of the chest and gastrointestinal series shows no front parenchymal involvement of either lung; cardiac and aortic shadows are of normal size. No organic lesion of stomach, duodenum, small or large bowel. Definite pericecal tender-

FIG. 1. Case 2, Larynx.

CASE NO. 3

HARPER HOSPITAL

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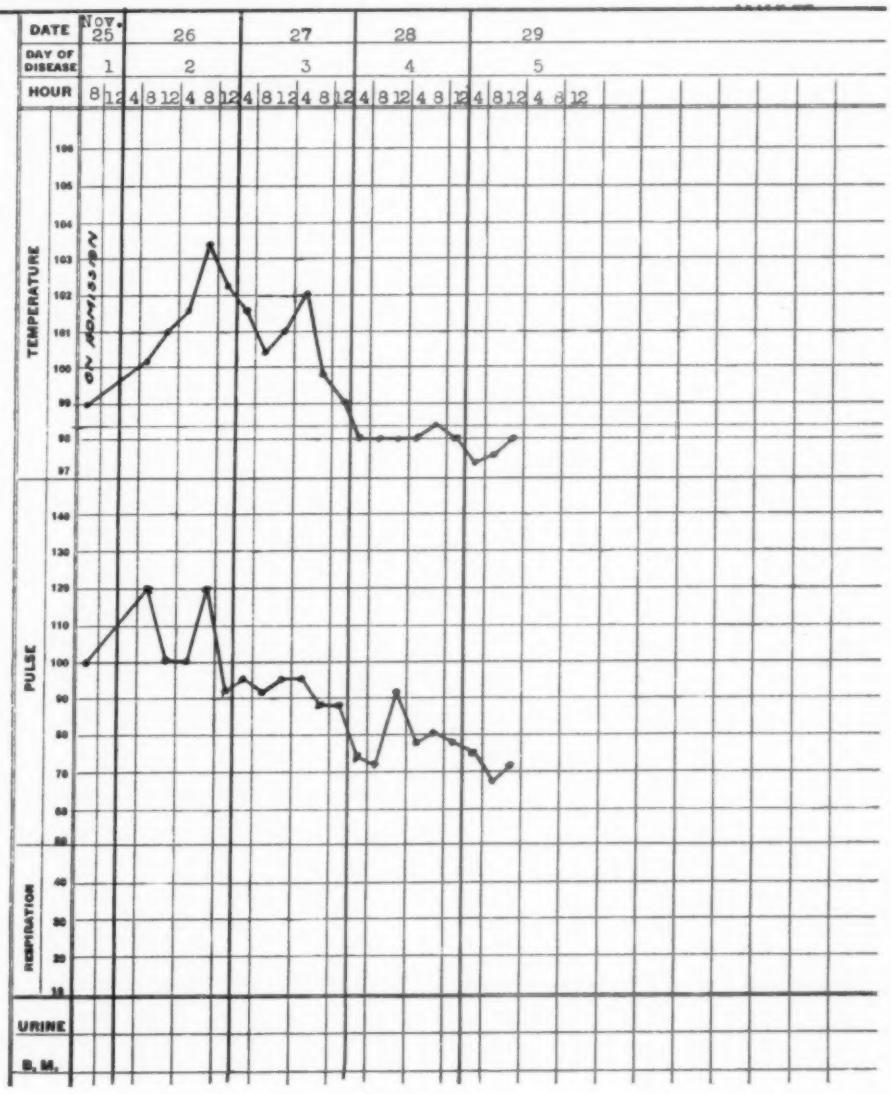

CHART 3

ness, cecum being low in pelvis. Non-filling of gall bladder with the dye.

On 11-24-29, one week after her discharge from the hospital, I was called to see her at the house, and found her with complaint of sore throat and severe prostration. Examination showed temperature 103., markedly prostrated patient, with icteric tinge to the skin. There was definite angina present with no ulceration. I sent her immediately to the hospital with the provisional diagnosis of agranulocytic angina. Blood count on admission to the hospital, November 24, 1929, showed 85 per cent. hemoglobin; 4,600,000 red cells; 2000 white cells and differential count; Polymorphonuclears only 4 per cent., lymphocytes 88 per cent, large monocytes 8 per cent, red bloods cells were normal. I gave her immediately 1 c.c. of nucleinic acid. Her blood counts while in the hospital were as follow at the end of this report. Her temperature rose to 103 on the second day after admittance, but dropped to normal on the fourth day and remained normal. Her temperature was 99 on admittance and pulse was 120, but pulse returned to 80 on the fourth day in the hospital. Smears of nose and throat were negative. Patient continued to improve and on the tenth day was discharged from the hospital apparently recovered.

Treatment given was nucleinic acid, 1 ampoule daily, leukocytic extract was given after blood transfusion of 450 c.c. which was given by the indirect method. After the transfusion, patient continued to improve. Her final blood count on December 13, 1929 was: W.B.C. 8800; Differential: Small 25%, Trans, 2% and Polys 73%.

Blood Counts While in the Hospital—(11-25-29 to 12-9-29):

11-25-29, Hgb. 85%; R.B.C. 4,600,000; W.B.C. 2000; P. 4, L. 88, M. 8, R.B.C. normal.

11-26-29, 11 A.M.: W.B.C. 1100; P. 8, L. 82, M. 10, R.B.C. normal.

11-26-29, 1 P.M.: W.B.C. 2300; P. 4, L. 86, M. 10, R.B.C. normal.

11-26-29, 4 P.M.: W.B.C. 3050; P. 6, L. 90, M. 4, R.B.C. normal. Blood transfusion, 450 c.c.

11-26-29, 10 P.M.: W.B.C. 2850; P. 2, L. 92, M. 6, R.B.C. normal

11-27-29, 8 A.M.: W,B.C. 1874; P. 37 L. 63, R.B.C. normal.

11-27-29 Schilling index, M=7; Y=8; R=18; P=4.

11-27-29, 1 P.M.: W.B.C. 1950; P. 45, L. 55; M.O. R.B.C. normal.

11-27-29, 8 P.M.: W.B.C. 2225; P. 49, L. 51; 2 Turck cells seen.

11-28-29, 8 A.M.: W.B.C. 2210; P. 48, L. 51, M. 1.

11-28-29, 1 P.M.: W.B.C. 3000; P. 40, L. 55, M. 5; some of the polys. being to take on eosinophilic character.

11-28-29, 8 P.M.: W.B.C. 3075; P. 44, L. 48, M. 8.

11-29-29, 8 A.M.: W.B.C. 3185, P. 48, L. 48, M, 4; some polys. appear natural.

11-29-29, 8 P.M.: W.B.C. 4,575; P. 45, L. 53, M. 2.

11-30-29, 8 A.M.: W.B.C. 4,625, P. 56, L. 42, M. 2.

11-30-29, 8 P.M.: W.B.C. 5,630, P. 66, L. 30, M. 4.

12-1-29, M A.M.: W.B.C., 10, 225; P. 81, L. 19, R.B.C. normal.

12-1-29, 8 P.M.: W.B.C. 10,050, P. 82, L. 18; normal morph.

12-2-29, W.B.C. 7,750, P. 65, L. 35, normal morph.

12-3-29, WB.C. 7,500; P. 60, 4, 39, M. 1, normal morph.

12-4-29, W.B.C. 8,150; P. 72, L. 28; normal morph.

12-5-29, W.B.C. 7,550, P 68, L. 32, normal morph.

12-6-29, W.B.C. 7,950, P. 62, L. 38, normal morph.

12-9-29, W.B.C. 6,650; P. 74, L. 25, M. 1.

11-26-29, NCN 30 mgs.; sugar 0.083%. CO_2 combining power 55.1, vol.%. Icteric Index 4. Van den Bergh: Direct neg.; Indirect—slightly positive. 11-29-29: Blood Wasserman neg.

Case No. 4—W.R.

Age 55. Male. Married. Business: advertising. *Family history* negative except mother died of Tbc. at 48. *Past history*—Typhoid and pneumonia at five years. Remittent fever at 18 years, duration 9 weeks.

Pneumonia at 42, mild case. Denies venereal.

Present Illness—Came to the hospital May 16, 1928 for study of cause of dizziness, shortness of breath and feeling of pressure over chest. He had recently noted that upon walking any distance he became dizzy and had to stop because of choking feeling. After resting a few minutes he could proceed. This had been going on for three months. For a time up to three weeks ago he improved by lessening his activities but it has returned and become more severe. Six weeks ago while walking he became very dizzy, faint, and experienced blurred vision with pressure in chest. He has been in bed for the past two weeks.

Physical examination was negative with these positive exceptions: well developed, pale, male. Tonsils enlarged and septic. Nasopharynx congested. Heart enlarged, pulse 60, irregular, slow, irregular sounds. At mitral and tricuspid areas 1st sound is low pitch, booming in character, 2nd. sound cannot be heard. At pulmonic area, 1st sound present, 2nd. absent. At aortic area 1st and 2nd. sounds barely audible and not distinct. Lungs were neg. Abdomen and extremities neg. Electrocardiogram showed sino-auricular block with occasional nodal rhythm. 5-17-28 R.B.C. 4,840,000; Hgb. 90%; C.I. 9; W.B.C. 7400; P. 74, L. 24, M. 2, Morph. normal. Urine neg. except few casts. Blood sugar 0.105. NCN 30 mgs. Blood Wasserman neg. B.M.C. 13%. Patient was discharged on May 20, 1928 with diagnosis of: Partial heart block and chronic tonsillitis.

Patient returned to the hospital May 26, 1928, because on May 21st he developed headache and sore throat with pains and aches throughout body. These symptoms increased and on May 23, the physician found slight congestion of the throat and that patient was very toxic. His temperature had ranged from 101 to 102 during the preceding 24 hours and was accompanied by a series of chills.

On May 24th the pains, sore throat and toxicity increased. Temperature was 104 and was accompanied by chills. Patient entered the hospital on May 26th with temperature of 104.2, pulse 88 and respirations 24. Throat was very congested and inflamed and showed numerous grayish plaques in soft palate and pharynx. R.B.C. 3,232,000; Hgb. 70%; W.B.C. 2200; P. 0, L. 89, 11, Blood pressure 65/40.

May 27th, 1928, W.B.C. 1800, P. 0, L. 62, M. 38. R.B.C. normal in size and shape. He also had thrombotic hemorrhoids. Patient died May 28, 1928, 3:52 A.M. with diagnosis of agranulocytic angina. Autopsy showed the typical bone marrow findings. It also showed arteriosclerosis of the coronary vessels and also the infarct in the bundle of His.

Conclusions: Summing up the story of this condition in the literature and from clinical observation, I believe that we may conclude the following: (1) At the present time it is impossible to decide whether this is a definite disease entity or whether it is the complication of some group of medical conditions or the result of some drug or chemical poisoning. (2) The cardinal symptoms of the disease are its acute onset with all the signs of a severe cold such as coryza, sore throat, high fever, joint and body pains. This is followed by severe angina with ulcerations and a definite leukopenia with absence of the granulocytes. And, finally, extreme prostration and death in the large majority of cases. (3) The course and prognosis is usually short, severe and fatal with very few exceptions. Those few who recover, recover temporarily. (4) The pathology shows an absolute lack of inflammatory process in the tissue surrounding the lesions and the bone marrow shows a lack of granulocytic structures. (5) Study of the cytology of the leucocytes early helps in making an early and correct prognosis. (6) The treatment which has been varied

has been of no avail with these exceptions: a few cases have been improved by blood transfusions, a few by x-ray of the long bones and spleen and two cases were probably cured by the use of nucleinic acid injections.

CASE NO. 4

HARPER HOSPITAL

NAME _____ ADMISSION NO. _____ DEPT. NO. _____

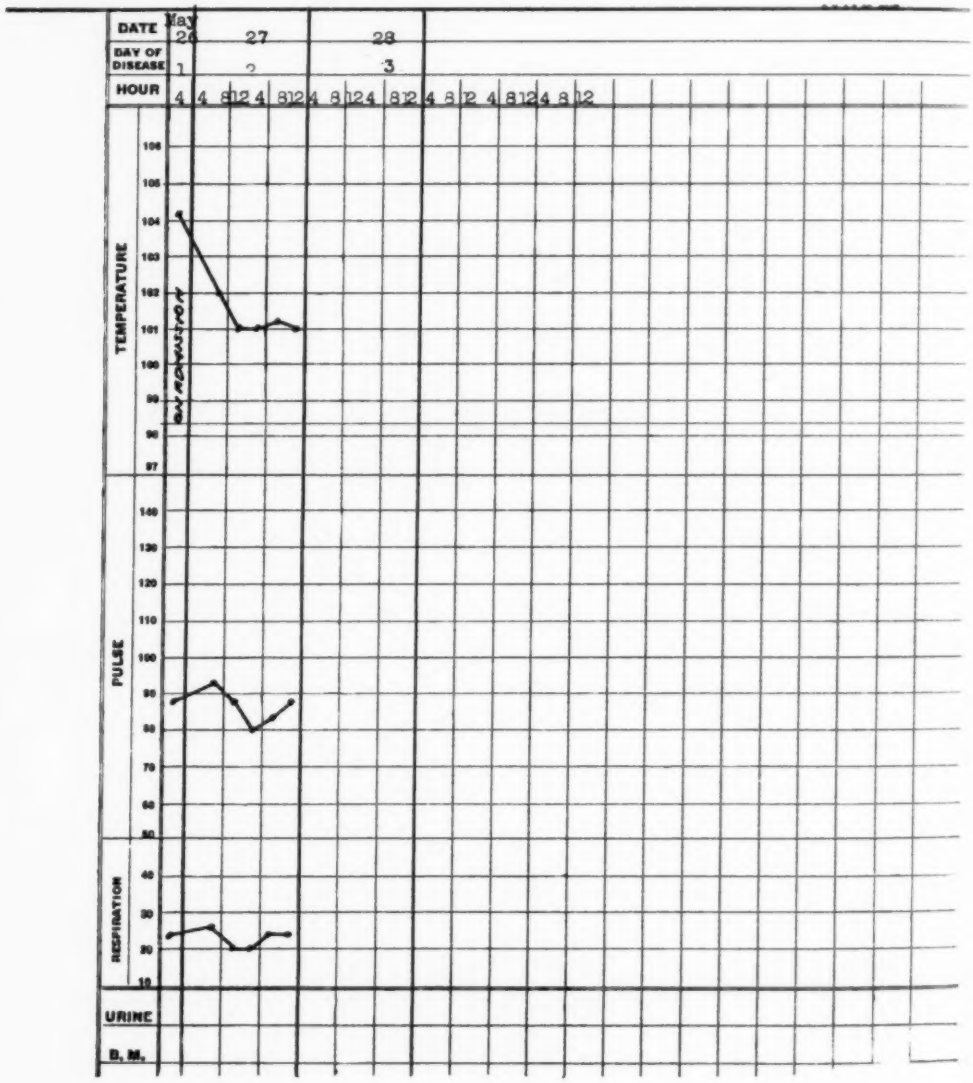

CHART 4

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Massive Collapse (Atelectasis) of the Lung, With a Case Report

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HISTORY. While W. Pasteur [1 2 3] has been given credit for first describing massive pulmonary collapse as it is now understood, a review of the literature reveals the fact that the study of this condition in the first half of the nineteenth century gave rise to much discussion, usually under the term "carnification" of the lung. There seemed to be considerable confusion with reference to the relation of this condition to pneumonia and fetal atelectasis. Not until 1844 did Legendre and Bailey[4] establish by postmortem studies the identity of congenital atelectasis and acquired massive collapse. No doubt stimulated by the work of Legendre and Bailey, Mendelssohn[5] in 1845 and Traube[6] in 1846 experimentally produced massive collapse by occulusion of the bronchi. In 1879, Lichtheim[7] confirmed the above experiments and proved that collapse in that portion of the lung normally aerated by the occluded bronchus was a result of absorption of the air by the blood stream. By the simultaneous occlusion of a bronchus and ligation of the corresponding bronchial vessels, he established the fact that collapse would not occur when the circulation was inhibited. In 1910, Pasteur's third paper[3] appeared under the title "Active Lobar Collapse of the Lung After Abdominal Operations." It was in this paper that cardiac displacement toward the affected side was clearly set forth as a significant diagnostic sign, and the definite relationship of massive collapse to surgery was first suggested. In two succeeding papers, 1911 and 1914, Pasteur[8–9] brought the knowledge of this condition to such a state of perfection from a diagnostic standpoint that there was little room left for additions. In America, the writings of West[10], Meigs[11] and Foster[12] are worthy of note. While these authors may have displayed a certain amount of originality, it seems that they made no important contributions to the knowledge existing at that time.

The rapidly increasing literature on this subject, with numerous case reports, serves to emphasize the frequent occurrence of the condition and its clinical significance. Bowen[13] points out the fact that during the six year period from 1921 to 1926 he was able to tabulate forty-eight papers dealing with massive collapse while in the one year 1927 he found half that number. Several of the papers appearing in the last few decades have dealt with the experimental production of massive

collapse but in the main they have only refined the experiments of Lichtheim and confirmed his results. Most noteworthy among these are the papers of Elliott and Dingley[14], and more recently, Coryllos and Birnbaum.[15] The experiments carried on by the latter authors were controlled by repeated x-ray examinations and are quite convincing in their verification of the cause, the symptoms and the physical signs. The cumulative evidence, both clinical and experimental, is overwhelmingly in favor of bronchial obstruction of some type as the cause, and of mucous plugs in the bronchi as the most constant single factor.

In 1927 Doctor Gordon Wilson,[16] before the American Climatological and Clinical Association, reported the observation of a marked negative intrapleural pressure in this condition, first studied in a post-traumatic case in 1921. At the annual meeting of this association, May, 1928, Doctor Charles C. Habliston[17] of Baltimore reported four cases of massive atelectasis due to four different types of bronchial obstruction in which he demonstrated the presence of high negative intrapleural pressure, and in which he relieved the distressing symptoms by introducing air into the pleural space on the side affected. Credit is due Wilson and Habliston for having further emphasized bronchial obstruction as the causative factor, for calling attention to the resulting high negative intrapleural pressure and its important rôle in the production of the characteristic symptoms and signs, and for demonstrating the practical therapeutic value of artificial pneumothorax in the relief of distressing symptoms in practically all cases, and as the most important contributing factor toward the ultimate cure of many cases. This will receive further consideration under Treatment.

Diagnosis. While the clinical features, including the physical signs, are quite characteristic and uniformly present and while a number of cases are being reported, it is reasonable to believe that many cases go undiagnosed because certain members of the profession are not as yet familiar with the clinical picture and the phenomena which give rise to the symptoms and signs. It is the author's opinion that all diagnosed cases should be closely studied and reported with the hope of gaining additional knowledge, and for the purpose of widely disseminating the knowledge already at hand. Especially should the authenticated facts with reference to diagnosis be widely published. These facts may be stated briefly as follows: There may be a history of a predisposing bronchitis, a pulmonary hemorrhage, or the aspiration of a foreign body. The knowledge of aneurysm, new growths or any other intrathoracic pathology which might cause bronchial occlusion, either by pressure from without or obstruction from within the bronchus should be taken into account. Trauma and surgical procedures are to be considered as predisposing factors.

Tht first symptoms are usually a rise of temperature, seldom above 101 to 102 degrees, and acceleration of the pulse and respiration. These are soon followed by pain in the chest and respiratory distress. The latter symptoms may become so acutely obvious that they suggest impending "catas-

trophe," a term first employed by Lee.[18] Such a sequence of events should immediately cause the attending physician to "think massive collapse."[19]

The physical signs must necessarily vary with the extent and degree of collapse and the presence or absence of compensatory emphysema.

In a typical case, the physical examination should elicit the following: Inspection reveals the anxious expression, the rapid respiration and cyanosis, and in some cases, cough with mucoid expectoration. The thorax on the affected side is relatively immobile with apparently some retraction of the chest wall, and in individuals with thin chest walls, the interspaces may be depressed and Litten's shadow may be absent or diminished. On the contralateral side expansion may be exaggerated, and the chest wall relatively prominent because of compensatory emphysema. The apex beat may be visibly displaced toward the side affected and its rate noted. Deviation of the trachea in the same direction may also be seen in some cases. The head may be inclined toward the affected side and the corresponding shoulder depressed, accentuating the concave line on that side of the body.

Palpation may confirm the changes in respiratory excursion, cardiac and tracheal displacement, and in most cases vocal fremitus will be absent or diminished over the collapsed lung.

Percussion usually reveals marked dullness over the area involved and increased resonance over the sound lung varying with the degree of compensatory emphysema. The displacement of the heart can usually be determined and the high position and partial fixation of the diaphragm may be demonstrated.

Auscultation varies with the cause of obstruction and the degree of collapse. In well established cases there is usually an absence of breath sounds or a distant bronchial or bronchovesicular sound over the affected area. Under such conditions the whispered or spoken voice is correspondingly absent or distant. There is usually an associated bronchitis; consequently, if breath sounds are heard at all, râles are apt to be present. Overlapping emphysematous lung tissue may modify the auscultatory sounds. The location of the heart sounds may help to determine the displacement of the heart. The characteristic cardiac displacement toward the affected side is the most significant of all the physical signs, and in the absence of chronic deforming pulmonary conditions such as fibroid phthisis with adhesive pleurisy which may grasp the heart in its retractile meshes, it should be considered pathognomonic.

As may be seen by the above recital of physical signs, the diagnosis should not be difficult. After becoming fairly familiar with the clinical description of the condition, one could explain failure to diagnose a well pronounced case only by admitting the truth of Jenner's famous aphorism, "Our mistakes are due to want of examination rather than to want of knowledge."

The x-ray is a valuable aid to diagnosis in that it confirms practically all the above physical signs, and for those who are careless or untrained in bedside methods, it may be the means of making a definite diagnosis. It immediately reveals the displacement of

heart, trachea, and diaphragm, and shows marked density in that portion of the lung involved.

Differential Diagnosis. Many physicians who are not familiar with massive collapse and the principles involved in its production are apt to confuse it with therapeutic collapse by means of artificial penumothorax or with spontaneous pneumothorax. In some respects spontaneous pneumothorax and massive collapse are similar. The sudden onset with pain in the chest, fever, dyspnea, rapid pulse and cyanosis may be found in both. Yet in many respects they are directly opposed to each other. In massive collapse the lung is airless because of bronchial obstruction and absorption of air. Negative pressure is created in which the pleural space participates. By virtue of this negative pressure the heart, trachea and diaphragm are displaced toward the collapsed lung in an effort to obliterate the vacuum. Pain and dyspnea are probably due to the displacement of these structures. In pneumothorax, the lung is collapsed because of pressure from air in the pleural space which may produce a high positive pressure. The heart and mediastinal structures are pushed away from the affected side and the diaphragm is displaced downward. Pain, dyspnea and cyanosis are the result of positive pressure and the displacement of the heart in the opposite direction with the added influence of infection of the pleural surfaces and the early development of fluid in the pleural space.

The physical signs in the two conditions are so obviously different that it seems unnecessary to enumerate them. If by any chance the examiner should be in doubt, he can rely on the x-ray for differential diagnosis.

Pneumonia is also to be differentiated from massive collapse. Pneumonia with extensive consolidation may easily be mistaken for massive collapse, or vice versa. Since massive collapse has been recognized as an occasional complication of pneumonia,[20] the diagnosis is rendered even more difficult. The absence of displacement of the heart, the characteristic physical signs of pneumonia, the higher fever, the bloody sputum and the higher white cell count will help to make the diagnosis of pneumonia.

Pulmonary embolism does not displace the heart, and is not apt to be diagnosed as massive collapse; no doubt, however, massive collapse is occasionally diagnosed as pulmonary embolism because the clinical picture of collapse is not generally appreciated, and because the onset in both conditions is sudden and singularly dramatic with the pronounced respiratory distress and cyanosis.

Acute heart failure from any cause, in the early course of its development, may be confused with massive collapse but a discriminating study of the history and physical signs will soon make the diagnosis clear.

Pleural effusion is seldom diagnosed as massive collapse but the reverse does undoubtedly happen as attested by dry taps and subsequent history. Bearing in mind the clinical picture of massive collapse there should be no difficulty in distinguishing the two conditions. The history of pleurisy with effusion, the absence of retraction of the chest wall, the smoothed out interspaces, the

displacement of the heart toward the sound side, the flat percussion note over the fluid with its curved line marking the upper limit of dullness and the presence of Grocco's triangle should make the diagnosis easy.

A family physician recently told me about a case in which he attempted aspiration of fluid from the pleural space, and much to his surprise, he failed to find fluid but observed a pronounced pull on the piston of his syringe. He finally withdrew the piston and permitted air to slowly enter the pleural space through the needle, which he controlled by placing his finger over the barrel of the syringe through which the negative pressure was manifested by a decided suction on his finger. To his great satisfaction his patient was perceptibly more comfortable, and after repeating the procedure two or three days in succession complete relief was obtained and the patient recovered. This case was reported to me only after I had placed in the hands of this physician Doctor Habliston's paper on massive collapse. After reading this paper a full realization of the true condition dawned upon him in a Pullman car several months after his accidental therapeutic success. This is a good example of the diagnostic light which is sure to accompany a clear conception of the clinical manifestations of this condition.

Treatment. The treatment of massive collapse, to be successful, must ultimately result in the removal of the bronchial obstruction. Even the symptomatic treatment is best accomplished by mechanical means rather than by drugs. As stated above, the negative pleural pressure initiates practically all the symptoms and signs and the relief of negative pressure is the first indication regardless of the cause of obstruction.

If this can be accomplished after the method of Sante,[21] by rolling the patient back and forth on the unaffected side, all well and good. If the patient's condition will permit, this method may be tried with the hope of relieving the obstruction while preparations for other therapeutic measures are under way. However, it appears that Sante is over-optimistic when we consider the mechanism of well established massive collapse. If this method of treatment does not result in prompt relief, artificial pneumothorax should be induced. It has been successfully employed by Habliston[17] and Ashbury,[22] and no unfavorable results have been reported. As already pointed out, this method of treatment meets the immediate indications and favors spontaneous dislodgment of the obstructing material. If bronchoscopic examination and treatment are required, the introduction of the instrument is more safely and easily accomplished after pneumothorax and the extraction of mucous plugs, foreign bodies or the removal of new growths is facilitated by the release of the suction caused by negative pressure. The success and the safety of this method will, to a great extent, depend upon the skill and experience of the operator. The same may be said of bronchoscopic treatment. Certainly pneumothorax is as safe as bronchoscopy and should be first employed. Bronchoscopic treatment, quite essential in some instances, should be reserved for those cases in which other methods have failed, and

employed after the distressing symptoms have been relieved by pneumothorax, and after the trachea and other mediastinal structures have been restored to their normal position so the operator will not be handicapped by conditions he is unaccustomed to and which may predispose to unnecessary trauma. The possibility of pleural adhesions obliterating the pleural space and thus making pneumothorax impossible should be kept in mind. This can be determined only by the failure of an experienced operator to find pleural space.

Case Report. On August 25, 1929, I was requested to see, with Doctors Horace Reed, William Taylor and Chester McHenry, a white female, age 13, with the following history. Upon admission to St. Anthony's Hospital on August 20, 1929, this concise but comprehensive statement with reference to present illness was recorded by the attending surgeon, Doctor Horace Reed, the patient having had no medical attention until a few hours before admission when Doctor Taylor was called.

"This patient first complained of abdominal distress and vomiting about ten days ago. On the following day she had tenderness in the right side of the abdomen and this tenderness has persisted to the present time. She has been out of bed part of the day during this time and has had fever until yesterday when she perspired profusely and her father thought she was free from fever. Following this she developed looseness of the bowels with cramps and diarrhea. Pain was controlled by an eighth of a grain of morphine given by mouth. As a result of this medication she appeared to be comfortable but fever continued. Examination shows a large fixed tender mass in the right abdomen just above McBurney's point. Impression: Abdominal abscess from ruptured appendix."

To this statement should be added the fact that the patient had what appeared to be a common cold with an associated bronchitis coincident with the onset of abdominal pain, and she was coughing and raising a mucoid material at the time of admission to the hospital. The past history and the family history are unimportant. The physical signs of bronchitis were recorded and the physical examination otherwise was negative. Upon admission, the pulse was 120; temperature, 102; blood pressure, 96 over 60; WBC, 26,000; P 78; L 20; T 2. Urinalysis was negative except for acetone which was reported three plus. Culture from abdominal abscess showed gram negative bacilli, probably colon bacilli. After a hypodermic of morphine 1/16 and atropine 1/300, the abdominal abscess was drained. No attempt was made to remove the appendix. The anesthesia employed was combined local and gas oxygen. In thirty-six hours the temperature returned to normal. The inclination to cough continued but the cough was restrained as far as possible because of the abdominal soreness and pain. The patient's general condition was considered very satisfactory but the nurses' record shows that cough continued, and occasionally, in spite of the pain caused by effective coughing, large masses of mucoid sputum were raised. Elix. terpin hydrate with

heroin was given for the cough and occasionally a small dose of morphine or codein for the cough and pain. At one o'clock on the morning of August 25th the temperature, after having been normal for three days, was recorded 101. At five o'clock, four hours later, the patient was awakened with a severe throbbing pain in the chest. The pulse was 130; temperature 101 3/5; and respiration, 37. A few hours later Doctor Reed examined the patient and made the following note:

"In the last few hours the patient has had a rather sudden temperature elevation and rapid respiration. The right side of the chest is retracted, the heart appears to be displaced toward the right, and on percussion, the right side of the chest is flat. Impression: Massive collapse of right lung—postoperative."

The x-ray (figure 1) confirmed Doctor Reed's findings. Consultation at this time resulted in a decision to induce artificial pneumothorax. The pneumothorax needle was introduced and the opening pressure was recorded, minus 10 minus 35, three hundred c. c. of air being introduced with a closing pressure of zero minus 20. The patient was promptly relieved of the most distressing symptoms and physical examination showed that the heart had returned to practically its normal position. X-ray of the chest made immediately after the treatment (figure 2) shows the heart and trachea in their normal relation to the other structures in the thorax. In twelve hours the pulse, temperature and respiration returned to normal, and all symptoms except the cough and expectoration disappeared. The subsequent course was uneventful. The cough and expectoration gradually disappeared, and on August 30th, the thoracic organs appeared to be normal, as shown by physical examination and the x-ray findings (figure 3). The patient was discharged from the hospital on September 3rd.

Conclusions

1. The occurrence of massive collapse of the lung is relatively frequent.

2. It is often diagnosed as spontaneous pneumothorax, pulmonary embolism, pulmonary infarct, acute cardiac failure, pleurisy with effusion, or pneumonia.

3. With the clinical picture of massive collapse once well in mind, such errors in diagnosis should not occur since the symptoms are striking and the physical signs represent gross changes thus making the diagnosis easy.

4. Displacement of the heart, trachea and diaphragm toward the affected area constitute the outstanding diagnostic feature.

5. A review of the literature indicates that the symptoms and signs are due to bronchial obstruction and the resulting negative pressure following absorption of the entrapped air.

6. The abnormal mechanical factors which exist as a result of this negative pressure tend to culminate in the symptom complex designated by Lee[18] as the respiratory "catastrophe."

Since these abnormal factors are promptly corrected by artificial pneumothorax, this method of treatment should be employed in every case

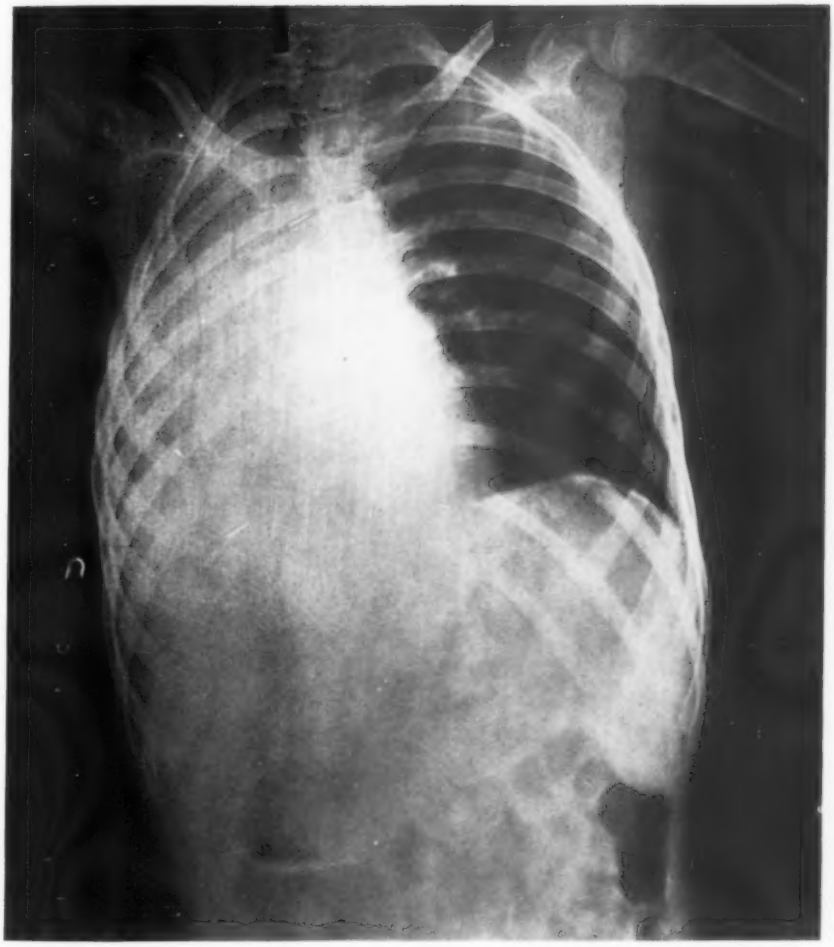

FIG. 1. There is a heavy shadow of rather irregular density filling the right side. The heart is pulled over so that it occupies about the same position on the right side that it should occupy on the left. Likewise the trachea deviates far to the right; on this side the diaphragm is also very high.

FIG. 2. Represents an X-ray of the chest a few hours after the introduction of 300 c. c. of air. Close inspection reveals the fact that there is moderate collapse of the lung due to pneumothorax, yet the capacity is much less than in Figure No. 1. However, the most striking feature in this picture is the return of the heart and trachea to their normal position and the descent of the diaphragm to its accustomed level.

FIG. 3. This picture was made five days later and shows the thoracic organs in their normal position with normal lung radiance on both sides.

where spontaneous relief is not experienced after rolling the patient on the unaffected side, as suggested by Sante.[21]

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Seasonal Hay Fever Not Due to Pollen*

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IT IS now an accepted fact that the majority of seasonal hay fever cases can be benefited by proper treatment with pollen extracts. It is also a very common observation, however, that there are many failures in such treatment. In a previous communication[1] I have called attention to some of the common reasons for failure to obtain satisfactory results. These were chiefly the failure to pay attention to: early preseasonal, combined with seasonal treatment; individualization of pollen dosages; preservation of potency of pollen; and careful determination of the species of pollen to be used in treatment.

In addition to the above reasons for failure it has become evident that there is another important factor. Pollen hay fever may be complicated by sensitization to things other than pollen, such as orris root, feathers, animal hairs, foods, etc. These complicating factors, although in some cases insufficient to produce clinical symptoms the remainder of the year, may aggravate the condition of the mucous membranes when the pollen season arrives. In such cases treatment directed to pollen alone may prove a complete failure. Balyeat[2, 3] discusses this question quite thoroughly. Phillips[4] as well as others have discussed the importance of these secondary causes.

Not all cases of seasonal hay fever are due to pollen. A rhinitis may be due to other substances which may take on a seasonal character for various reasons. Phillips[4] has already emphasized this fact in connection with orris root sensitization. Spain[5] says that "not always, however, do patients whose symptoms are confined to a definite season of the year prove to be pollen cases." Balyeat[6] calls further attention to this fact.

During this summer I have observed two cases, the history and course of which illustrate this very nicely.

Case I.

Mrs. J. L. R., a physician's wife, aged 34, consulted me on June 11, 1929, for her hay fever. Her symptoms during the season consisted of sneezing, profuse watery discharge from nose, nasal obstruction, itching of nose and eyes, and lacrymation. These symptoms have been present for eight seasons, but they have become quite marked in the last three or four seasons. The hay fever began each year in August continuing through September, with the exception of 1927 when it began in the latter part of July. She had no symptoms at the time of her visit.

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She has had a few mild "colds" in winter which were not accompanied by lacrymation or nasal itching.

There are no house pets. She sleeps on a feather pillow and hair mattress, and has down and hair stuffing in furniture. She has a variety of furs. She uses face powder known to contain orris root and also uses bath powder freely during the summer.

She has had a tonsillectomy in 1924 without any effect on the hay fever. There is no familial history of asthma, hay fever, urticaria, or eczema.

Skin tests made with the pollen causing hay fever in this vicinity were all negative. Intradermal tests with ragweed pollen extracts of 1:1,000 and grass pollen extract of 1:1,000 were also negative. The dry pollen of the giant and short ragweed placed in the conjunctical sac caused no hay fever reaction.

Because of slight peculiarities in her history it was suspected that there might be a sensitiveness to orris root. The cutaneous test with the latter resulted in a + + + + reaction. She was then tested completely with other proteins such as epidermal, foods and miscellaneous materials — — — — with negative results.

The patient was instructed to change her face powder to one definitely known not to contain orris root and to remove all bath powder and other cosmetics which might contain orris root. No other treatment was used.

She had followed the above direction and on October 17, 1929, she reports that she has had absolutely no symptoms of hay fever during the entire pollen season.

Case II.

Miss B. L., a young woman, was referred to me by an otolaryngologist on June 19, 1929, with complaints of sneezing, rhinitis, blocking of nose and lacrymation. These symptoms were marked at the time of the examination. She says that she has had these symptoms for the last four years during June and July. At times she has had slight symptoms during April or August.

She uses face powder known to contain orris root. She does not employ any talcum powder, although there are several members in the household who do use it. Her mother has a vasomotor rhinitis. Other points in her history were of no significance.

The history was of course suggestive of grass pollen hay fever. The grass pollen as well as other pollen were negative on cutaneous tests. Intradermal tests with grass pollen of 1:1,000 were also negative. The cutaneous reaction to orris root was + + +.

She was instructed to change her face powder and other toilet preparations. On June 24, five days after the first visit, she reported that she was almost entirely relieved of her hay fever symptoms. On September 11 she reported that, with the exception of an occasional sneeze, she has had no trouble since the last report.

Summary

Two cases of seasonal hay fever are reported in which tests and subsequent therapeutic results showed them to be caused by orris root and not by pollen. The seasonal nature of these cases is to be explained by the fact that the limit of tolerance to the orris root has been exceeded only during the summer months when the use of powder is excessive. These cases are presented to emphasize the fact that in the management of hay fever patients thorough testing with pollens is imperative as well as a consideration of other factors which may be responsible for the symptoms.

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Cavitation and Repair of Pulmonary Tuberculosis

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UNTIL recent years the occurrence of cavity in the course of pulmonary tuberculosis was accepted as heralding the doom of the patient.

The study of serial radiographs, however, disclosing annular shadows that contracted and even disappeared awakened the observers to the possibility of cavities becoming not only healed but even obliterated with little or no evidence of their past occurrence.

This was not accepted at first, such annular shadows being classified as pleural shadows; but the evidence produced by many observers has established the conviction that cavities can heal with or without leaving evidence of their past occurrence.

The question that presents itself is: why do some cavities heal and others do not?

The obvious answer is: some individuals develop more resistance than others.

Simple as such an answer appears it involves a maze of tangled paths that requires considerable thought and study to discover which one leads to the desired end.

This paper is an attempt to designate these paths and correlate the mass of evidence from many sources with personal clinical experience and radiographic observations.

The fundamental principles of cavity formation and their radiographic characters have been well presented by Baum, Mebel and Kane[1] and these will be accepted for the purpose of tracing the sequential course of tuberculosis pulmonary lesions.

The success or failure of resistance to invasion by an organism depends on two factors: the virulence of the organism on the one hand, and on the other upon the amount of immunity present or allergy developed (we shall not here consider massiveness of dose).

If the resistance is sufficient to overcome the virulence we shall call it a high or rising allergy or immunity, as the case may be; if insufficient, a low or falling allergy, or immunity.

It is here necessary to discuss allergy and immunity, as much difference of opinion exists as to their relationship.

Krause defines immunity as a function of allergy and enunciates laws that make them run a parallel course.

On the other hand, when we come to consider Ranke's classification of the different stages of pulmonary tuberculosis, we will find that he considers the third stage as that in which allergy has ceased and immunity has become established.

As we shall see, exudative lesions are characteristic of the first and second allergic stages and productive lesions are characteristic of the third

stage "when allergy has ceased and immunity has been established."

Pinner points out that animal experimentation can not throw much light on this difference of opinion, inasmuch as most experimental animals die in Ranke's second stage.[2]

Willis[3] in discussing an attempt to account for the discrepancy (according to Krause's hypothesis) between the coexistence of a high immunity and a low or apparently absent allergy refers to the fact established by Wollstein that a person after recovery from typhoid fever, or after inoculation of typhoid vaccine, may not necessarily give a good agglutination test under ordinary circumstances, yet exhibit a good Widal reaction almost immediately after a new introduction of typhoid bacilli or vaccine into the body.

It may therefore be assumed, without unwarranted assumption on our part, that an individual may have a healed or non-allegic lesion, with even a temporary loss of immunity but invasion of a not too virulent organism may awaken not only allergy but an outstripping immunity, with the result that allergy is subordinated and immunity reactions become dominant. Further, without denying that healing of an allergic lesion can occur by resorption or even by restitution we may further predicate that since exudation is a lesion of allergy and productivity a lesion of immunity it is the imbalance between allergy and immunity that determines whether an exudative or productive lesion develops.

We may now go on to consider the production of cavity and repair, correlating the pathological changes with the three stages determined by Ranke, i.e. exudative, alterative, and productive.

In the initial infection with tubercle bacilli (the primary infect of Ranke) there is an attempt to wall off the invading bacilli resulting in an exudative inflammation of the parenchyma of the lung, around the site of invasion.

This may be successful and resorption occur. Since the infiltration is into the open spaces of the lung (alveoli etc.) the underlying structure remains intact, and such a lesion may be resorbed without injury to the lung.

On the other hand, bacilli may escape to the periphery and there form new tubercles ("resorption tubercles"). These new tubercles are prone to break down and undergo caseation. As they unite with the caseating center, necrosis occurring from without in, there is thus produced a cavity with irregular walls (notched border) presenting the appearance on the radiograph of an irregular "clover-leaf" edge.

There is little perifocal inflammation so that no clouded lung parenchyma is interposed between the X-ray tube and film within the boundary of the annular shadow. Moreover, as caseation and repair travel from without in, these cavities give the appearance of a sequestrum—so called "sequestrum cavity."

Further, such cavities, when small, may give no physical signs (due to normal lung tissue between them and the chest wall) producing the so-called "silent cavity."

Such cavities usually occur in the outer third of the field and below the second rib—this being the site of election of the primary complex.

In spite of the excavation of lung tissue that may occur in these cavities, it is possible to have persisting numerous elastic fibers, and it is the presence of these elastic fibers that form a basis for new connective tissue and contraction and even for reconstruction of lung tissue when the cavity heals.

Should allergy be low (or late in development) the breaking down lesion may disseminate the bacilli to other parts of the lung, initiating the second allergic stage.

These changes are graphically shown on chart I.

Before considering what occurs in

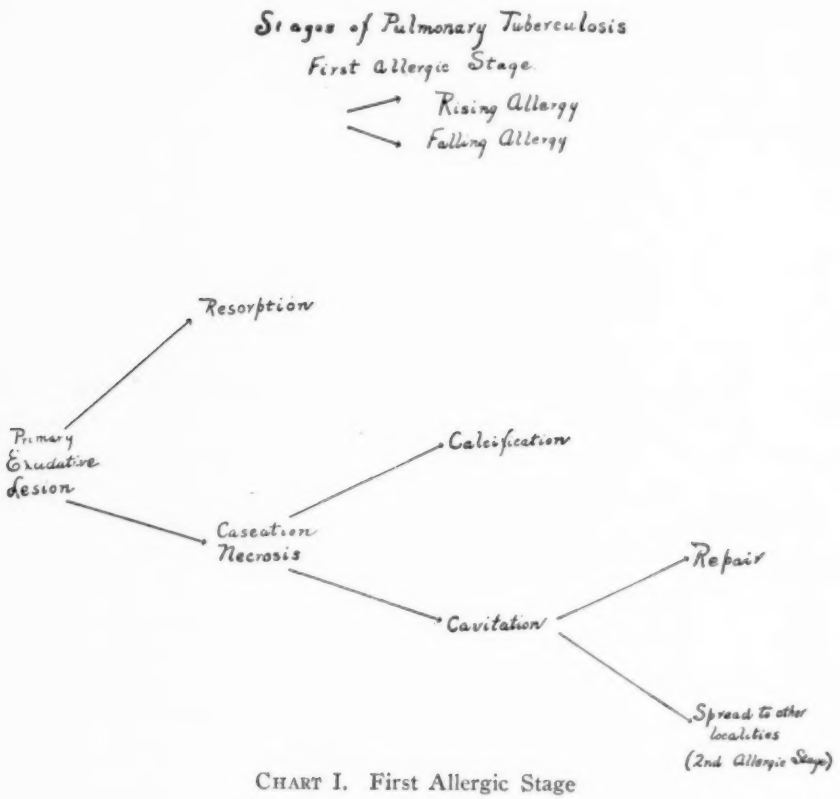

CHART I. First Allergic Stage

the second allergic stage, it is necessary to refer to an observation by Koch and known as Koch's phenomenon.

Koch discovered that animals already infected by living tubercle react differently to an injection of tubercle bacilli than normal animals.

In healthy animals an injection of virulent bacilli tends to produce a generalized tuberculosis from dissemination from the original focus.

In tuberculous infected animals an entirely different series of events occurs. Soon after inoculation there is an inflammatory reaction at the site of inoculation, this becomes intense

ending in necrosis and sloughing but the process does not disseminate, remaining a purely local reaction.

Romer further found that if a small amount of bacilli be inoculated in these already infected animals the reaction may be so slight as to subside and healing follow—a large amount of bacilli producing extensive sloughing and death of the animal from cachexia.[4]

Briefly summed up we may say that in a primary infection the allergy is localized, there being no barrier to generalized spread—in the secondary infection the allergy is general and this barrier while causing a more severe local reaction prevents generalized spread.

Bearing in mind this distinction between localized allergy in the primary infect, and a generalized allergy in the secondary lesion, we can readily understand the pathological changes in the second allergic stage.

What occurs in a secondary spread depends in a way on the number of lesions—for ease of description we will designate them as single or multiple. A spread to multiple sites, even though considerable allergy exists may overwhelm the resistance by the third factor of infection: massiveness of dose; we have then the usually fatal type of invasion (miliary tuberculosis,) which according to Korteweg and Hoeffler can occur only in allergic organisms.[2]

When the dissemination is not so great, there is not such an overwhelming of resistance—there follows caseation and necrosis, with either extensive catacombing of the lung from a caseating or desquamating pneumonia or cavities with a fibrogenetic wall but which require the third productive stage of Ranke to become obliterated, paralleling somewhat the second type of miliary tuberculosis of Heubschaman and Arnold, as referred to by Pinner[2].

Such cavities seldom heal without heavy fibrotic formation. (3rd stage) or spread by juxtaposition.

When the lesion is single, however, there is an intense allergic reaction and a more diffused response of the tissues surrounding the secondary lesion (comparable to the more severe reaction observed in Koch's phenomenon) this is the "circumfocal inflammation" of Ranke.

The allergic reaction may be so intense as to cause the lesion to pass directly into a stage of liquefaction necrosis without caseation. There is an absence of resportion tubercles about the edge, so that the annular shadow presents a uniformly smooth rounded border. These cavities may be further recognized in the x-ray film by the haziness within the annular shadow from the interposition of the inflamed lung between them and the chest walls. They are not confined to the outer third of the field—occurring almost anywhere, and furthermore, due to the absence of resorption tubercles, they may exist without tubercle bacilli in the sputum.

This cavity (the pyoid cavity) offers two extremes in the final outcome. The allergic reaction may be so severe that allergy defeats its own ends —there may be a violent diffuse necrosis spread throughout a part of the lung. On the other hand resorption or repair is more easily secured than in either the primary or tertiary stage.

These cavities may also have bands of the resistant elastic tissue to aid contraction and repair; and there being no broken down resorption tubercles at the edge, the walls of such a cavity can come together evenly and smoothly and heal with the minimum amount of scar tissue, which may further contract to a more or less noticeable density on the x-ray film.

If allergy, in the second lesion, is but moderately present, there is liable to occur a proliferative response rather than a pyoid cavity, as referred to by Pottenger[5] and due to auto-tuberculin inoculation.

An increased allergy at this time may lead to resorption or repair but if allergy does not rise this proliferative response may infiltrate the lung tissue and such a condition may go on to a generalized fibroid phthisis.

This condition was referred to by me in a paper on Radiographic Diagnosis of Pulmonary Tuberculosis[6] published in 1924.

I believe this is the condition indicated on the radiograph by general minute ringed markings. One observes that these markings may occur without displacement of the central shadow, in which case they often disappear leaving the lung intact.

On the other hand, if evidence of contraction appears it is an indication that the stage of proliferative response has passed and the third stage of productive lesions is fully developed.

Cavitation of the secondary lesion may also occur by caseation necrosis. As the conditions of a primary lesion are approached in this process one can readily believe that this occurs because the allergic response is too weak to produce an allergic or pyoid cavity.

Should allergy remain low extensive spread or catacombing may occur but with a rising allergy there occurs a proliferative response in which case a cavity may develop with a wall of proliferation which ultimately will produce a capsule of productive tissue in the third stage.

Such cavities, therefore, do not heal by resorption or repair—they will be referred to under the third stage of Ranke.

(See diagrammatic representation of changes in second allergic stage.)

When the third or productive stage is reached, the healing of cavities without x-ray evidence is a remote possibility.

We can readily understand this. In the productive stage there is a formation of a new tissue—this tissue does not infiltrate into the interstices of the lung structures but forces its way onward through the lung. Such a new tissue is prone to become permanent tissue showing a permanent density on the x-ray film, and if cavity has occurred this density will be visible about the annular shadow and may force its way onward to the periphery of the lung.

Therefore when such a cavity heals, it heals by contraction of this fibrous tissue, the condition frequently alluded to as the closing fan, and several such lesions may lead to a cirrhosis of the lung.

On the other hand, there may be sufficient immunity present to produce a productive response but insufficient in amount to produce fibrotic contraction of the lung.

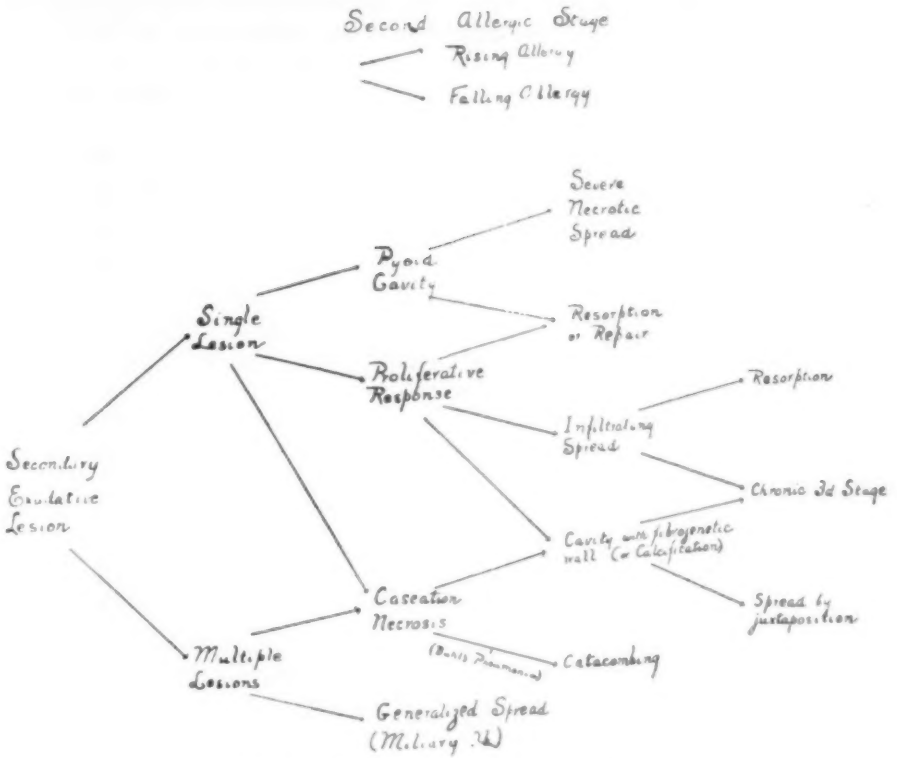

CHART II. Second Allergic Stage.

In such a condition cavities tend to coalesce and spread throughout the lung without apparent check—in spite of the generalized productive tuberculization—awakening no apparent reaction in the lung tissues, and even occasionally with little systematic response.

Such cavities may be frequently recognized by the irregularity of their boundaries (due to the coalescence of adjacent annular shadows) as well as by the density of their borders (due to productive response.)

Further presumptive evidence of third stage cavities is the synchronous presence (especially in the collateral lung) of apparently first or second allergic stage lesions, due to new implantations.

Rappaport[7] refers to Redeker's investigations in this field in regard to "subsequent infiltrations" occurring at short intervals, until one "subsequent infiltration" occurs that will not go into healing. "Allergy rises to the danger line, and all previous foci, incompletely healed become surrounded by infiltrations again."

Some confusion evidently exists in the interpretation of Ranke's third stage inasmuch as in Rappaport's article this stage is characterized as possessing a lack of allergy and "by tubercles proliferating into adjacent tissues without reaction."

On the other hand, most translators refer to Ranke's third stage as being "exudative, productive, cirrhotic."

The inclusion of exudative lesions in Ranke's third stage would indicate there was a reaction between new implantations and adjacent tissues.

Observations based on clinical experience and radiographic evidence warrant this conclusion.

Inplantations may occur in Ranke's third stage without interruption of clinical sequence (the "subsequent infiltrations" of Redeker.) What then occurs depends on a phase of allergy and immunity we have already discussed.

If allergy is reawakened to dominance an exudative lesion or lesions occur, which may again pass through the changes of a secondary exudative lesion—if immunity dominates the reaction, we may then have the chronic productive progressive tuberculization of Redeker, fibrosis or repair.

If there has been a complete healing of a lesion in the third stage of Ranke, when immunity and allergy have been entirely lost (in which occurence the time factor plays the most important rôle) the new lesion (or late infiltration of Redeker) will then have all the characteristics of the primary infect of Ranke.

Thus the conclusion of Rappaport based on the researches of Redeker might well be the conclusion of the foregoing arguments based on the researches of Ranke:

"It is therefore justly brought out by Redeker that a sharp distinction must be made between 'subsequent infiltrations' that come in the form of re-exacerbations which may be linked to the infiltrations preceding it, and such 'late infiltrations' as are in time, and clinical sequence, far removed from any previous infiltrations. 'Late infiltrations' really represent a new 'initial infiltration' out of which, in exactly the same manner as described in connection with the 'initial infiltration,' the great variety of tuberculous conditions of the lung is seen to develop; most frequently in patients between the age of forty and sixty years."

(See diagrammatic representation of changes in the third stage.)

Conclusions

(1) The healing of cavity may occur in any stage of Ranke's classification.

(2) In the primary and particularly in the secondary allergic stage healing may occur with little or no evidence of previous lesion.

(3) In the tertiary stage healing being dependent on contraction of fibrous tissue (or calcification) permanent evidence remains of the healed lesion.

(4) The characteristics of a primary lesion are dependent on the absence of allergy at the time of implantation; the course of the lesion is dependent upon the rate of production and amount of allergic reaction.

(5) The characteristics of the secondary lesion are dependent on the presence of allergy on implantation and the course of the lesion is dependent upon the amount of allergic reaction.

(6) The characteristics of lesions in Ranke's tertiary stage are dependent

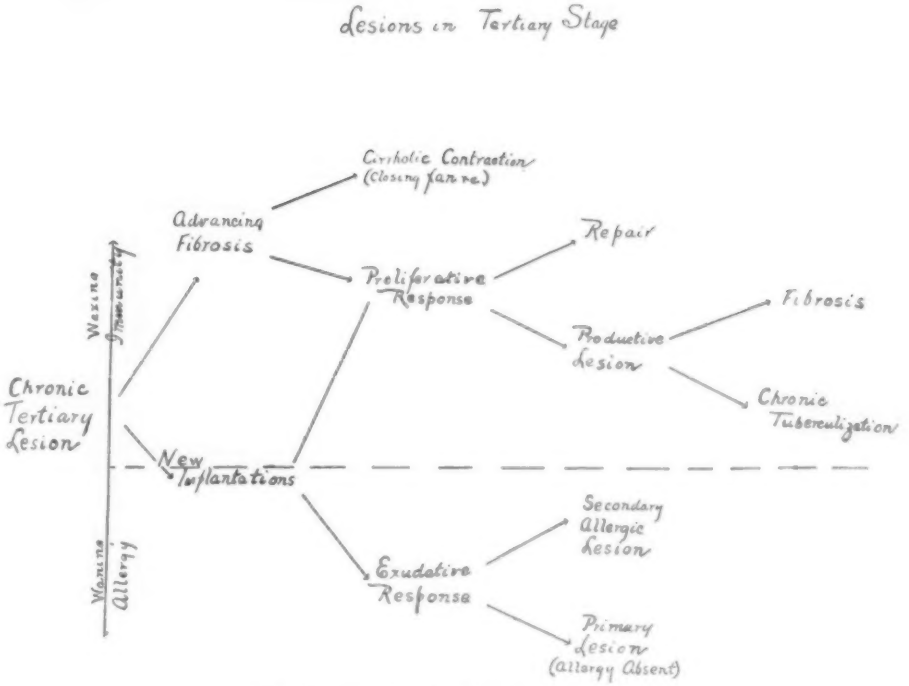

CHART III. Lesions in Tertiary Stage.

upon the presence of immunity and latency of allergy. The course of sequential implantations is dependent upon the imbalance between an awakened allergy and the existing or waning immunity.

New implantations in this stage are controlled by the same factors.

[4]BAUM, MEBEL & KANE, Amer. Rev. Tuberc., 1928, XVIII, 596.

[2]PINNER, M.: Amer. Rev. Tuberc., 1928, XVII, 601.

[3]WILLIS, HENRY STUART: Amer. Rev. Tuberc, 1928, XVII, 240.

[4]PARK & WILLIAMS, Pathogenic Microorganisms, 1924. 437.

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Medical Men Who Have Attained Fame in Other Fields of Endeavor

I. Medical Men as Musicians

By Ernest Weinfield, B.S., M.D., *New Orleans*

ONE of the most splendid tributes to the medical profession was paid by R. L. Stevenson, who in the dedication of "Underwoods" said, "There are men and classes of men that stand above the common herd; the soldier, the sailor, and the shepherd not infrequently; the artist rarely, more rarely still the clergyman; the physician almost as a rule. He is the flower (such as it is) of our civilization; and when that stage of man is done with, and only remembered to be marveled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibits the virtues of the race. Generosity he has, such as is possible only to those who practice an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and, what are more important, Herculean cheerfulness and courage. So it is that he brings air and cheer into the sick room, and often enough, though not so often as he wishes, brings healing." Being an invalid from early childhood and knowing the physicians well throughout his life of physical frailty, Stevenson was eminently fitted to pronounce judgment upon them as a class.

In the following I wish to show the medical man as standing out above the common herd in other fields of endeavor. Although we are prone to think of the medical men only in the light of their profession we do not regard sufficiently those who have attained fame in other fields. We think of the doctor of today as a busy, overworked man like all professionals or industrials in modern life with little of the leisure which people enjoyed in the ages gone by. I wish to call your attention to those who have won recogtion, fame and distinction during periods of mental relaxation in other fields of endeavor, either while still meeting the demands of their chosen vocation, or after relinquishing this line of work for new fields of adventure. It is not possible to cover in any one paper the complete list of doctors who have grown famous in other fields. Some names will be omitted but enough will be grouped and classified to confirm the statement that many physicians have succeeded in other endeavors aside from their success as medical practitioners.

Medical Men as Musicians

While many articles have been written on the value of music as a healing agent, it is my purpose only to call your attention to those who have cared for music, those who became proficient performers upon some instrument, or composers, usually at the expense of what little leisure time was available. It is interesting to recall the fact that the two faculties of medicine and music have at times been united in a sufficient degree to result in their possessor's name being inscribed in both the Medical Register and various histories of music.

An early instance, according to Pits, may be found in the sixteenth century English physician, George Ethridge of Oxford who was one of the most famous vocal and instrumental musicians of the day in his own country, which at the time was in the very forefront among musical nations. (He was still living in 1585). According to Garrison, the earliest of the great European physicians to follow music as a pleasure or hobby was Felix Plater (1534-1564) of Basel who made a large collection of instruments, which still exists, played three or four of them, was an accomplished lutanist, and in his youth employed his talents in serenading his sweethearts.

The earliest extant compositions by a medical man are three songs, (dated 1596), by Thomas Campion (1570-1619), of Cambridge, England. He published Latin and English Poems as well as four books on "Ayres". He was also a theorist: his "New Way of making Foure parts in Counterpart, by a most familiar and infallible Rule".

In the seventeenth century the learned Jesuit priest, Athanasius Kircher (1602-1680) of Fulda, who was not only a medical man, but an accomplished mathematician, physicist, optician, microscopist and Orientalist. In 1640, he published at Rome, his "Musurigia Universalis sive Ars magna consoni et dissoni in X. libros digesta", a huge folio of some 1,200 pages, which is a vast summary of all that was known of the theory of music in his time, including the anatomy and physiology of the ear and the throat in man and animals, descriptions and cuts of the different musical instruments, the science of harmony, the physic of the Pythagorean monochord, symphoniurgy or the art of composing melodies, a history of Greek and later music, a long account of chromatics and enharmonics, the theory of time and rhythms in music, in which the rhythms of the Greek, Hebrew and other poets are considered, canon and the art of writing for different instruments. It contains notations of the songs of different birds and the sounds of animals, well executed full-page plates representing various musical instruments, and strange specimens of ecclesiastical and other music of Kircher's time.

Caspar Bartholinus (1655-1738) the Danish physician who was the son of the famous anatomist published in 1679 "De tibris veterum", a study of the double-flutes of Greece, from which the clarinet, the basset horn, the oboe, the English horn and other woodwind instruments are derived.

In the eighteenth century, John Arbuthnot (1667-1735) of England was a composer of sacred anthems. He was a friend and medical adviser

of the poet Pope and wrote "As Pants the Hart".

David Fraser Harris, M.D., S.M., B.Sc., F.R.S.E., F.S.A., Lecturer on Physiology in the University of St. Andrews, Scotland, amid his many other studies found time to become a good musician. He wrote "Saint Cecilia's Hall in the Niddry Wynd", a chapter in the history of music of the past in Edinburgh.

Herrmann Boerhaave (1668-1738), of Leyden, one of the great medical teachers and theorists of his time, was perhaps the first physician on record to cultivate chamber music at his house, according to Burton. Music was his most delightful entertainment and he was not only a good performer on several instruments, particularly the lute, which he accompanied also with his voice, but a good theorist in the science, having read the ancient and best modern authors on the subjects, as appears by the lectures he gave on sound and hearing.

Richard Brocklesby (1722-97), one of the founders of military hygiene, published in 1749 an anonymous treatise recommending music for the cure of disease. The theme is as ancient as music itself—witness the familiar passages in Homer, Shakespeare and other poets, Dryden's "Alexander's Feast" and "St. Cecilia".

Leopold Auenbrugger (1722-1809) of Vienna, the discoverer of percussion of the chest in diagnosis, wrote the libretto for "The Chimney-Sweep" (Der Rauchfangkehrer), an opera of Solierio which was a great favorite with Maria Theresa.

A medical man whose name is familiar to lovers of music is Thomas Harrington (1728-1816) of Kelston, Somerset, England. His round, "Great is the Pleasure", is one of the prettiest examples of that very popular form of composition. Of his works, his hymn tune "Harrington" sometimes known as "Retirement", and his glee "Dame Durden" suffice to carry his name to posterity. His leisure was devoted to composition when in Bath, where he established himself as a medical practitioner, being appointed Alderman and subsequently Mayor. He gained such a reputation that he was appointed "Composer and physician", on the foundation of the Harmonic Society of Bath. He wrote 4 volumes of glees and catches. Though it is by his secular works and a hymn-tune that he is best known, he also composed a dirge, "Eloi! Eloi! or the Death of Christ" for Passion Week.

William Withering (1741-99), a Birmingham practitioner who introduced the use of digitalis in heart disease, devoted his leisure hours to the flute and harpsichord.

The house of Johann Peter Frank (1745-1821), the founder of modern public hygiene, was frequented by Beethoven.

Edward Jenner (1749-1823) played both the violin and the flute.

John Ring (1752-1821) of Wincanton, England, best known as a strong advocate of vaccination in its early days, was an amateur musician and a poet, both of which faculties came into play in his "Commemoration of Handel".

Although John Hunter did not appreciate music his wife, Anne Hunter was a patron of music and wrote the words for Haydn's "Creation" and for

his charming canzonet, "My Mother Bids Me Bind My Hair".

William Kitchner (1775-1827) was born in London, educated at Eton and took his doctor's degree in medicine at Glasgow University. He inherited a fortune from his father which made him independent of exercising his profession and he devoted himself to scientific and other pursuits among which music took a prominent place. In addition to editing the "Loyal and National Songs of England, for one, two and three voices selected from original manuscripts and early printed copies in the Library of William Kitchener, M.D., London, 1823," "Sea Songs of England", and the "Sea Songs" of Charles Dibdin, with a memoir of his Life and Writings (1824)", he composed "Amatory and Anacreontic Songs Set to Music" (Solo songs, glees and catches for the Anacreontic Society, an aristocratic but not too refined musical society). Kitchener composed a musical drama under the title "Ivanhoe, of the Knight Templars", and an operetta, "Love Among the Roses, or the Master Key,". He also published a book in 1821 of "Observation on Vocal Music".

Florent Corneille Kist (1796-1863) was born at Arnheim, studied medicine and practiced as a doctor at the Hague until 1825, after which he seemed to have abandoned himself almost entirely to the "Devine Art". In 1827 he founded the "Diligentia" music society, organized and presided over several singing societies. His printed compositions consist of vocal pieces for one and several voices, and a volume of variations for the flute, on which, and on the horn, he was an excellent performer; and some larger works, such as cantatas which remain in manuscript. But it is chiefly as an organizer of musical societies at Delft, the Hague, and Utrecht; and founder of Cecilia, which at the present day remains the most important musical paper in Holland, that he will be remembered. He also wrote musico-historical works of some importance.

Sir Robert Christison (1797-1882) of Edinburgh who wrote the first treatise on toxicology in English, although self taught in music, was a good bass singer. Dr. Christison, Dr. Bennett, Dr. Maclagan and Dr. Peddie were among the first gentlemen amateur vocalists who ventured to perform publicly in Edinburgh. They sang much together and were known as the singing doctors. In making a crossing from Brighton and Dieppe in his early days Christison found that his travelling companions—two English and two Irish doctors and Schetky, a drawing master, were musical, so that he was able to improvise a nautical concert: Turner, a violincellist, Corban a violinist, Crawford a flutist, and Schetky a violincellist.

Emile Joseph Maurice Cheve (1804-1864) was born at Dowarnenez, Finistere. He wrote a complete exposition on the tonic-sol-fa and "Movable Doh" system (invented by Guido, of Arezzo (995-1050 A.D.) a monk), and profession. He also founded a music school "Methods Elementaire de la Musique Vocale," in which he taught on the new plan, and tried repeatedly, though in vain, to provoke the Conservatoire into a discussion of their respective methods. It made

considerable progress and is now allowed in the communal schools.

Sir William Fergusson (1808-77), of Prestonpan, Scotland, was a very accomplished violinist.

Joseph Hyrtl (1810-94) was the first and greatest teacher of topographical and regional anatomy in the nineteenth century. His father, a musician in the Count Esterhazy's band, had played an oboe under Hayden and Hyrtl, himself a chorister in his youth. He was one of the greatest medical philologists, a man to whom written and spoken Latin were as his mother tongue.

Henry Ingersoll Bowditch (1808-92) the eminent clinician was an intense lover of music. His father Nathaniel Bowditch gave up playing the flute because at one time it brought him in contact with companions whom he thought undesirable in their morals, and in consequence of which he denied the study of music to his children. He always regretted that he never learned any musical instrument. Whistling was his only accomplishment. He says, "Music has been all my life long my delight and my inspiration. I have listened (while standing three and a quarter hours in the Sistine Chapel) to the 'Miserere', and was almost persuaded thereby to become a Catholic". His wife (Olivia) was a talented singer and performer on the piano and harp, sometimes accompanying the fine voices of her sons on these instruments.

That the scientific training which a medical man receives, in the case of his having a gift for music should turn his thoughts to the theory of the art, seems but natural. Little surprise need be felt therefore that one of the best known, if not most widely accepted, theoretical methods, the Day theory, is the work of a physician. Alfred Day (1810-1849) was born in London. His devotion to the theory of the art was due to his not having been allowed in earlier life to give sufficient time to its practical side to become proficient as a performer. His father had insisted on his studying medicine and he accordingly did so in London, Paris and Heidelberg, from which latter place he took his degree. Thereafter he practiced in London as a homoepathist. He is the best known as the author of an original "Treatise on Harmony" which after many years of study, he published in 1845. In this treatise he advocated reforms in terminology and teaching, formulated a new sort of bass-figuring to supplant the ordinary thorough-bass, and made many interesting and practical suggestions. It was revolutionary, since there was hardly any department of the subject the teaching of which the author did not propose to reform; in the words of Sir Herbert H. Parry "no other theory yet proposed can rival it in consistency and comprehensiveness" and while few authorities accept it as a whole there are probably even fewer among subsequent writers who have not been influenced by its appeal to the fundamental chord of nature and consequent orderliness and rational system.

Sir Richard Owen (1804-92) besides being an excellent chess player was an accomplished violincellist. He was very fond of the old classics but the music of Grieg and Wagner he considered as too futuristic.

Jacob Henle (1809-95) the greatest German histologist of his time and one of the greatest anatomists of all times was an accomplished musician as well as a poet and skillful artist. Beginning with the violin and eventually learning to play both viola and violincello, so that he might take any part at need in an impromptu string quartet. Henle's friendship with Humbolt, Gustav Magnus, and Felix Mendelssohn, is most interesting.

Carl Friedrich Wilhelm Ludwig (1816-95) of Leipsig, another great physiologist, was very appreciative of music, followed the Gewandhaus concerts and had chamber music at his house.

Thedor Wilhelm Engleman whose name will always be associated with Gaskell's in the physiology of heart muscle was a friend of Brahms' and to hmi Brahms dedicated his charming string quartette in B flat.

Herman von Helmholtz (1821-94) was not only a performer and learned connoisseur of music and musical literature, but he was the founder of musical aesthetics as a science, the author of the most exhaustive treatise on the physiological basis of tonal sensations which has ever been achieved, his "Tonempfindungen" (or tonal sensations). During his life he was an ardent concert goer and could have been an able critic of music.

Max Schultz (1825-74), the histologist, was a good violist, a friend of music devoting his leisure hours to the violin.

Theodor Billroth (1829-94), the pioneer of visceral surgery, was one of the greatest lovers of music. He received a thorough musical education and was an excellent pianist. He was an intimate friend of Brahms and Hanslick, and they formed a sort of artistic triumvirate. Of this friendship Billroth's "Briefe" are a fascinating memorial and in his unique musical correspondence, recounts of the musical life of Vienna, the concerts, operas and oratorios, Billroth's piano duets with his friends, and the chamber music evenings, at which Brahms was of course the central figure. During his residence at Vienna (1867 till his death) the musical soirees at his house were famous. It was at Billroth's house that almost all the chamber-music of Brahms was performed before it had its first performance in public. Besides Billroth's "Briefe" (edited by George Fischer, 1895; 7th edition 1906) he also wrote "Wer ist musikalisch?" (edited by Hanslick 1896, 4th ed. 1912) which is a miniature pendant to Helmholtz's treatise on tonal sensation.

Wilhelm His (1831-1904) identified the remains of Bach and had the sculptor Seffner make a bust of the great composer from his measurements, which turned out to be an admirable likeness.

Robert Cameron (1838-1876) of Logie Coldstone, Scotland, settled in Australia as a medical practitioner. He composed vocal music and numerous overtures and also served as critic for various journals.

T. L. Phipson, a physician of London, England, has left permanent memorials of his love of music in a translation of De Be Beritt's "Methods de Violin". His original works include "Biographical Sketches and Anecdotes of Celebrated Violinists"

(London, 1877) "Bellini and the Opera of La Sonnambula" (1880), "Famous Violinists and Fine Violins," "Historical Notes, Anecdotes and Reminiscences" (1896). He was a very fine musician and his powers as an executant are sufficiently proved by his having been at some time president and solo violinist of the Bohemian Orchestral Society.

Alexander Ponfinevitch Borodin (1834-87) was an army-surgeon and later become a professor at the Petrograd Medico-Surgical Institute. He was president of the Music Society of Amateurs. He was intimate with Liszt (in Wiemar) and Balakirev, at whose suggestion he studied music, of which he was passionately fond. He became a foremost exponent of the neo-Russian musical cult. His works comprise a 4-act opera, "Prince Igor" (posthumously finished by Rimsky-Korsakov and Glazunov), 3 symphonies, symphonic poem, "Dans les Steppes de l'Asia Centrale," scherzo for orchestra, 2 string-quartets, string trio, piano quintet, piano pieces and songs.

Bernard Naunyn (1839-) the eminent clinician at Strassburg was a man of widest culture, especially in music. He overcame a great deal of prejudice and opposition among the Alsatian population on account of his austere demeanor, through his attractive chamber music evenings, which came to be important social functions in the city. His wife was a talented singer.

Julius Jensen, the alienist, also had a talented wife, and was often seen with "Notenhefte" under his arm at concerts.

Ludimar Hermann, Julius Jacobson Wilhelm Ebstein, Karl Kahlbaum, the psychiatrist who described hebephrenia and katatonia were all musical, sometimes giving concerts at home.

Duke Karl Theodor of Bavaria, who became a well-known opthalmologist, was musical and played in an orchestra.

Alfred de Bary, an assistant of Flechsig at Leipsig, was at once professor of psychiatry and a prominent tenor at Bayreuth and Munich.

Christian A. Herter (1865-1910) of Glenville, Connecticut, who was founder of the Journal of Biological Chemistry and Jacques Loeb (1859-1925) who was head of the Department of Experimental Biology in the Rockefeller Institute were excellent musicians.

John Cohnheim Hemmeter (1863-) is the composer of a cantata for male chorus and full orchestra, "Hygeia" which he dedicated to Professor William H. Welch. He investigated the physiologic and anatomic foundations of piano technique and of vocal tone production. I may add that Hemmeter is the author of the first complete work in the English language on diseases of the stomach and his "Diseases of the Intestines" (2 vol., 1901) is the only complete work on this subject in the English language. Hemmeter discovered that the x-ray could be used for studying abnormal conditions of the digestive tract (1896) and also that it was possible to investigate the stomach contents directly by the introduction of tubes, and also to pass tubes in the duodenum.

Sidney Kuh (1866-) the neu-

rologist and psychiatrist, D'Orsay Hecht, and Gustav Langmann, have been capable performers or even composers.

Arpad G. Gerster (1848-) in his "Recollections" says: "What musical training I managed to acquire has yielded me much pleasure amidst the cares and fatigues of professional life, for discernment and appreciation of good music are of greater importance for the non-professional lover of the art than technical facility".

Nicholas Steer, a schoolmate of Gerster, held gatherings in his rooms while studying medicine in Vienna, for a select coterie of students eminent for their scholarship or as musical connoisseurs. Steer showed a decided musical talent very early and soon became a pianist, above the level of dilettantism. During his connection with Billroth's Clinic this accomplishment was honored by frequent invitations to play four hands with the Professor, also a splendid pianist.

A string quartette was organized under Ernst Schwessel's leadership which performed at Gerster's house every four weeks during the winter months. With occasional interruptions these reunions continued during fourteen years. The membership varied somewhat but among its more permanent constituents were, Schwessel, first violin, Dr. Fred Kammerer, 'cellist, Dr. Felix Cohn, violist, Donaldson, 2nd violinist. Later Ulysse Buehler, the pianist, took active part in the chamber music. He played with the Dannreuther Sunday Quartette at Dr. Knight's, the continuation of Dr. Sands' Quartette Club. The quartette repertoire was varied by trios, quintettes, and occasionally a duo. Bach's concerto for two violins and piano in D minor was invariably played once a year.

In 1884 John White played several of Bach's organ compositions during a series of recitals at the Old Chickering Hall. They created such a profound impression that under the stress of his emotions Gerster bought an organ. He practiced on the organ of All Soul's Church twice weekly for two years and later said, "Although technical accomplishment was denied, thorough acquaintance with Bach's organ works made my organ practice more than worth while." To attest Gerster's love for music during the year October 1872-October 1873, he attended 62 operas.

In the Life of Elie Metchnikoff (1845-1916) his wife (Olga) speaks of him as a great lover of music. "The last examinations took place in the spring of 1862. It happened to be the Italian Opera season and Elie could not resist the temptations offered him by music. In order to make up the time, he often had to work the whole night long at the cost of severe fatigue." During his stay in Germany, music was the young man's only recreation. He did not play any instrument, his parents discouraged him yet he certainly had a natural talent for music, which he passionately loved. He could only whistle, but with that feeble means succeeded in reproducing complicated compositions. Having assiduously attended excellent concerts, he had made himself thoroughly acquainted with classical music, and Beethoven

and Mozart always remained his favorite composers.

Fritz Kreisler, as well as many other well known musicians, studied medicine.

The Berlin Medical Orchestra has as practicing members only physicians, even foreigners are accepted. As honorary members the association admits contributors and patrons. The rehearsals were held in the Kaiserin Friedrich-Haus. Each year a charity concert is given, the profits of which are for the benefit of the widows and orphans of deceased physicians. The association had about sixty members, among whom was Professor His, the director of the first Medical Clinic, who was a violin virtuoso.

Vienna and Paris both have similar medical orchestras.

An orchestra composed of physicians and a chorus, likewise of physicians, gave a concert in Berlin. The program included Mendelssohn's "Walpurgisnacht", Bach's Third Concerto and the Bach cantata, "Gott der Herr ist Sonn 'und Schild".

An orchestra of eighteen pieces has been organized by the secretary of the Summit County (Ohio) Medical Society, Dr. Alexander S. McCormick. The players are all physicians except the drummer and a saxophone player, who are the son and nephew, respectively, of physicians.

There is an orchestra composed entirely of physicians in Newark, New Jersey, which at present comprises eighteen members and performs at medical functions.

Professor Janos Bokay, director of the Pediatric Clinic of Budapest University, an ardent musician, and president of the Medical Philharmonic Club, commemorated the centenary of Beethoven's death by reading to the medical society an excellent and most interesting paper entitled "The Deafness, Last Illness and Death of Beethoven".

Editorials

THE ONLY HUMAN VERTEBRATE PARASITE

For more than a hundred years travellers and explorers returning from the valley of the Amazon have brought back the strange story of a fish alleged to have the extraordinary habit of entering the human urethra, in both male and female bathers, particularly when passing urine while bathing. The unfortunate victim of such a remarkable accident, particularly the male, finds himself in a most serious predicament, for this tiny fish, once engaged in the urethra, fastens itself there through the erection of spinous processes on its gill covers, and can be removed only by means of a most serious operation, amputation of the penis. The stories have it that both men and women bathers in the Amazonian headwaters protect their genitalia, while bathing, by means of various coverings made of cocoanut shells or bark. If these stories are true, great scientific and medical interest attaches to this fish and its peculiar habits, since it would be the only known vertebrate parasite of man. Dr. E. W. Gudger*, of the American Museum of Natural History, has for many years been collecting the accounts of this alleged habit of the Candirú, and has just published these data, together with what is most probably the true explanation of this long alleged phenomenon. The first account is that of Martius, who tells the story in his preface to Spix and Agassiz's "Selecta Genera" (1829). He says: "Concerning another fish which is also dangerous to man, I ought to add some things. The Brazilians call this fish Candirú, the Spaniards living in the province of Maynas (Peru) name it Canero. By a singular instinct it is incited to enter the excretory openings of the human body when it can get at those parts in those who are bathing in the river. With great violence it forces its way in, and desiring to eat the flesh it unfortunately brings danger to human life. These little fishes are strangely attracted by the odor of urine, and consequently the dwellers in those parts when about to go into the river Amazon, in whose bays this pest abounds, constrict the prepuce with a string and refrain from urinating." In 1831 Martius again refers to this matter in the third volume of Spix and Martius "Reise in Brasilien" as follows: "A species of this genus, the Candirú of the aborigines . . . has the habit of entering with great impetuosity and rapidity into the external openings of the human body. It thus brings about a most painful and dangerous accident since it stretches out its fins, and can-

*On the Alleged Penetration of the Human Urethra By an Amazonian Catfish called Candirú. American Journal of Surgery, N.S., Vol. VIII, p. 170.

not be gotten out save with great difficulty. The odor of man's excretions appears to attract the little fish, and the Indians therefore advise that while in bathing none of this excretion be passed, and that this particular organ be covered carefully." The next mention of the Candirú occurs in the writings of Poeppig (1836). In a footnote he says that "The fresh juice of the Xagua is rightfully claimed to be the surest means of killing and getting rid of those two-inch long little fishes which slip into the outer openings of the bodies of careless bathers and bring about the most frightful accidents. . . . The attack of such a fish in such a manner is such an extraordinary thing that one can scarcely believe it. . . . In Yurimagnas I myself have been an eyewitness of such a case. An Indian woman, after the penetration by a Canero into the vagina, suffered such frightful pain and loss of blood that she was given up to die. Howevei, after both internal and external applications of Xagua, the little fish was gotten out and the woman came through alive." Mention of this fish and its habits was made in 1840 and 1841 without adding any actual facts to the case. In 1855 Castelnau described a little siluroid fish, as a new species from the Araguay and Amazon rivers, of which he makes the following extraordinary observation: "This species is, on the part of the fishermen of the Araguay, the object of a most singular prejudice. They claim that it is very dangerous to urinate into the river, because, they allege, this little animal launches itself out of the water and penetrates the urethra by ascending the length of the liquid columr." When Reinhardt (1859) discovered a small, slender catfish provided with retrorse gill-cover spines, living in the gill-cavities of a huge silurid of another family ,he sought from its habits to connect his fish with the Candirú. He regarded it as highly probable that if not identical with his species, it must be one closely related to it. During the next two decades the story of the Candirú and its alleged penetration of the urethra is repeated by most travellers in Brazil, although none of them had seen a case confirmatory of it. The story told with so much circumspection and detail by the natives to these various explorers apparently made most of them believe that a real danger existed. In 1897 Dr. G. A. Boulenger exhibited specimens of fish collected by Dr. J. Bach in the course of an exploration of the Rio Jurura, a southwestern tributary of the Amazon, with the following data concerning the habits of the fish: "The Candyrú, as the fish is called, is much dreaded by the natives of the Jurura district, who, in order to protect themselves, rarely enter the river without covering their genitalia by means of a sheath formed of a small cocoanut shell, with a minute perforation to let out urine, maintained in a sort of bag of palm-fibers, suspended from a belt of the same material. The fish is attracted by the urine, and when once it has made its way into the urethra, cannot be pulled out again owing to the spines which arm its opercles. The only means of preventing it from reaching the bladder, where it causes inflammation and ultimately death, is to instantly amputate the penis; and at Tres Unidos, Dr. Bach had actually

examined a man and three boys with amputated penes as a result of this dreadful accident. Dr. Bach was therefore satisfied that the account given of this extraordinary habit of the 'Candyrú' is perfectly trustworthy." In 1898 Jobert wrote an article in which he gave his own observations and critically discussed the whole matter. Although expressing much doubt as to the truth of the various stories, Jobert does think there is some foundation for these allegations, and had personal experience while in bathing near Pará, by receiving scarifications on his body from some small fishes. On showing these wounds to Dr. Castro, a physician of high standing in Pará, and a man much interested in natural history, Jobert was assured by him that his wounds were made by the fish and convinced him of his firm belief in the possibility of urethral penetration by the same: "Because I have myself extracted from the urethra of a negress a little Candirú which had penetrated during micturition while bathing in the river. The patient experienced cruel suffering, for since I had to drag the animal out the extraction was difficult, and the mucous membrane was lacerated." Krause (1911), Woodroffe (1914) and Rudolf von Ihering (1914) all appear to be convinced of the truth of the allegation as to the penetration of the body openings by the Candirú, although not possessing any first-hand knowledge of its actual occurrence. Dr. C. H. Eigenmann, the outstanding authority on South American fishes, gives an extended account of the Candirú stories, and indicates plainly that he had full belief in the oft-repeated tale, to the extent that he established a new genus of Candirú, *Urinophilus erythrurus*. The last published account of this parasite is by Paul Le Cointe (1922), who says of the Candirú: "The worst is that it penetrates sometimes into the anal and urinal apertures of men and women bathers, and there erects the terrible spines which oppose all efforts to extract it, thus causing terrible disorders if it is not gotten out with the greatest care. I have personally known already three cases of this curious accident." W. E. Pearson, one of Eigenmann's students, adds a hearsay instance of the penetration of the vagina by a Candirú in the Rio Beni region where it seems that females alone are attacked. Gudger marshals the evidence to and for the Candirú, as a lawyer would in court, and after a careful analysis of the habits of these fish he is able to show a steady and unbroken gradation of habits leading to endoparasitism in certain forms in those species loosely called Candirús. The secretive action of these cat fish, the fact that they are colorless or translucent, their carnivorous habits, and the definite establishment of ectoparasitism in some species make it not a far cry to the establishment of the habit of semi-internal living in the branchial chambers of the host, and the development of an instinct to enter the external openings of the body. From a number of observers it has been definitely determined that various members of the catfish family are carnivorous, and that they will attack, by attaching themselves to living fishes and mammals, and even to man himself. Müller writing from Wallis' notes (1870)

says of the Candirú of the Huallaga that: "It is a formidable plague for bathers, a species of blood sucker indeed which with incredible powers of swimming goes to the body and inflicts a cupping-glass-like wound, and when it has succeeded so that it holds itself fast to the body, it spreads out in the wound a bundle of needles whereby, as if with barbs, it clings so tightly that only by a painful operation can it be separated from the body." Thus is ectoparasitism definitely established, and taken in connection with Jobert's experience at Pará, there can be no doubt that there certainly exist in Brazilian waters fishes of small size that are capable of attacking men and drawing blood. Of the ectoparasitism of these small catfish upon larger fish there is abundant evidence in the literature. Endoparasitism in a fish of this family was first established by Reinhardt (1859) in his discovery of *Stegophilus insidiosus,* and was confirmed in 1911, by Pelligrin, whose descriptions make it clear that this fish is a blood-sucking parasite adapted for penetrating between the gills of large fishes, and that it, or a near relative, was Jobert's assailant. Their gill penetration and blood-sucking habits have undoubtedly grown out of their primal ancestral habit of creeping under objects and into cavities for protection and for animal food. It has been conclusively shown that the more specialized catfish are attracted by flesh and blood, that they will attack and scarify, not only the gills and bodies of mammalian beasts, and that they will also puncture the skin and suck the blood of man. They are attracted, particularly to man, by the odorous secretions given off by the body. It does not seem too much to think that they would be attracted by the most abundant, and possibly the most tropic of all, urine. The evidence as set forth seems strongly to indicate that the Candirús are tropic to urine. Gudger says that during the many years in which he had been collecting accounts of the alleged penetration of the human urethra by the Candirú, he had been very skeptical on the subject. In medical literature he has found 74 cases of invertebrate penetrations and voidings of the human urethra. If certain elongate and sinuous invertebrates do penetrate the human urethra, do the elongate and sinuous Candirús penetrate also? From all of the known accounts by explorers and naturalists, from the persistent widespread local belief and the universal use of protective contrivances by the natives in the region where these fish are found, and the testimony of competent eye-witnesses, Gudger concludes that this evidence is sufficient to convince a jury in a court of law, and that he cannot withhold his belief in the penetration of the human urethra by the Candirú, a slender catfish found in Amazonian waters. This fish is therefore to be regarded as the only known vertebrate parasite of man.

Abstracts

Cardiac Pain. A Consideration of Its Nosology and Clinical Associations. By ROBERT L. LEVY (Amer. Heart Jour., 1924, Vol. IV, p. 377).

Pain in the region of the heart is a common complaint. Its significance for the patient may be slight or grave; but since Heberden's time, the occurrence of such pain has come to carry with it, in the minds of the laity, and in the judgment of many physicians as well, the suggestion of sudden death. The "disorder of the breast" described by Heberden, in the light of increasing experience, has proved to be the symptomatic manifestations of many pathological states. The perpetuation of the name originally given to the condition, and the concept of angina as a clinical entity, has resulted in confusion and disagreement as to its precise meaning. It is therefore suggested that the term "angina pectoris" be abandoned. Correlation of clinical and pathological data has demonstrated that cardiac pain may be associated with a variety of structural and functional changes. Pain resulting from disturbances in the region of the heart is best described as *cardiac pain.* In making a complete cardiac diagnosis, this should be qualified by the statement as to the probable structural and functional changes with which the pain is associated. Further knowledge concerning the mechanism of pain production may point the way to a more precise terminology. The conception of pain as a symptom will make for better diagnosis, for rational therapy, and for more accurate prognosis. If pain be regarded as an expression of a disturbed functional or structural state, therapy must be directed toward correcting or alleviating the basic disorder. This is the plan usually followed in medical or surgical practice; it is the logical procedure when the pain originates in the heart. Levy is pessimistic as to the treatment of cardiac pain by the attempt to obtain symptomatic relief through surgery of the cervical sympathetic. The results of cervical sympathectomy so far have been variable, and on the whole, disappointing. It is his opinion that this operation will prove to have a very limited field of usefulness. He regards the paravertebral injection of alcohol into the posterior nerve roots as an uncertain procedure, unaided by visual guidance and not without hazard. The relief afforded in some instances may well be due to blocking of cutaneous impulses, and while prompt in some cases, may be only temporary.

Urobilinuria in Vomiting of Pregnancy. By VICTOR JOHN HARDING *and* H. B. VAN WYCK (Jour. of Obst. and Gyn. of the Brit. Empire, Vol. 36, No. 3).

In a previous paper these workers discussed the serum protein values in vomiting of pregnancy. They stated that, in general, a high value for serum protein meant a favorable prognosis, and a relatively easy treatment. But in a few cases, although the ultimate outcome was successful, the course of treatment offered difficulties. Their final study leads them to conclude that the long series of observations carried on by them shows that four factors must be considered in the treatment of vomiitng of pregnancy:—starvation, dehydration, hepatic dysfunction and neurosis. Except for the latter, the use of fluids and glucose usually form sufficient therapy. In occasional cases, the hepatic function fails to be restored coincidently with or immediately following the overcoming of the dehydration. In some cases they recommend the feeding of a higher number of calories in the form of a large amount of carbohydrate and a little protein. While the factors can thus be stated in general terms, the extent to which each is present in individual patients will vary. Urobilinuria is present in about 80 per cent of all

cases of nausea and vomiting in pregnancy admitted to the wards of the Toronto General Hospital. On resumption of food after dehydration has been removed the urobilinuria generally disappears. Some cases show a persistent urobilinuria. Generally a persistent urobilinuria is to be correlated with a slow recovery from vomiting of pregnancy. In some cases of persistent urobilinuria it has been found necessary to feed by means of duodenal tube.

Action of Ephedrine and Pseudoephedrine Upon the Bronchial Muscle. By C. PAK and T. KING (Proc. of the Soc. f. Exper. Biol. and Med., January, 1930, p. 253).

These workers studied the peripheral action of ephedrine and pseudoephedrine on rabbit bronchial muscle, using their modified method of the isolated lung perfusion described by Sollmann and Van Oettingen. The response of the bronchial muscle varied with the dosage. Perfusion with highly diluted concentrations, such as 1:1,000,000 to 1:5,000,000 in 6 experiments produced a definite bronchial dilatation, and the effect of 1:1,000,000 was more distinct than that of the more dilute solution. Comparing this effect with the action of ephedrine on the circulation and other smooth muscles the bronchial dilation is probably a sympathetic reaction. Perfusion with moderate concentrations of ephedrine, namely, 1:10,000 to 1,200,000 in 7 experiments uniformly caused bronchial constriction, and the effect of 1:10,000 was stronger than that of 1:100,000. In 4 experiments, atropine 1:400,000, perfused for 6-10 minutes previous to ephedrine had no influence on the bronchial constricting effect of ephedrine. In this instance the broncho-constricting effect of ephedrine is probably a muscular effect, and its sympathetic action is apparently not present. Perfusion with high concentrations, i.e., 1:200 to 1:2,000 in 9 experiments caused either marked constriction (4 cases), or marked dilatation of the bronchioles, depending on the condition of the bronchial muscle and its sensitivity to drugs. The constricting effect was more pronounced than that from moderate concentrations of ephedrine. The marked dilatation may be due to direct muscular depression, as the subsequent injection of barium chloride produced no effect. The action of pseudoephedrine on the bronchiel muscle is similar to that of ephedrine. Concentrations between 1.1,000,000 and 1:100,000 in 5 experiments produced bronchial dilatation in sensitive bronchial preparations, but no effects in insensitive ones. The perfusion with 1:10,000 and with 1:2,000 each in 2 experiments produced a regular distinct bronchial constriction, and the constricting effect of 1:10,000 was apparently stronger than the same concentration of ephedrine. Pseudoephedrine seems to be more musculotropic than ephedrine. These workers conclude that ephedrine is a sympathomimetic and musculotropic drug, and this fact confirms further the observation of Pak and Read on the blood pressor action. The divergent results obtained by different workers are possibly due to dissimilar dosage, one may have used larger doses in which the sympathetic action was overpowered by strong muscular action, or, on the other hand, small dosage may have been used, which produces a pure sympathetic effect.

Krebsantikörper bei Krebskranken. By L. KIRZFELD and W. HALBER, with the clinical cooperation of M. Flockstrumpf and J. Kolodziejski (Klin. Wochenschr., February 22, 1930, p. 342).

These workers succeeded in demonstrating the presence of complement-binding antibodies, which react with sufficiently sensitive cancer antigens, in the sera of cancer patients, particularly in those suffering from cancer of the digestive tract, uterus and mamma. A small part of these sera gave a positive Wassermann reaction; positive lues sera react with alcoholic extracts of cancer. In explanation the conception of "Zerfallskrankheiten" is advanced, and the reaction is ascribed to the coincident presence of both specific and non-specific lipoids in cancer tissue. The sera of pregnant women also reacts with cancer antigens. The possibility is discussed that in the latter case there are anti-bodies produced against substances which occur during embryonal growth, and that these substances in cancers and embryos are identical or related. In this case the reaction with

cancer antigens must be considered as a growth reaction. These workers refrain from speaking of a clinical-diagnostic reaction. Although the latter is the ultimate object of their investigation, they feel that the clinical application of their reaction to the diagnosis of cancer and pregnancy will not be possible for some time.

Syphilis Immunity and Syphilitic Superinfection without Symptoms in the Human Individual. By R. PRIGZE and E. VON RUTKOWSKI (Dtsch. med. Wochenschr., 1929, p. 1509).

These workers succeeded in producing a superinfection in a case of paresis, by inoculating spirochete material from the testicular syphilitic lesion of a rabbit. This superinfection ran a course without symptoms—a chancre immunity; the superinfection was proved to exist by the successful inoculation of extirpated inguinal nodes into a mouse and thence into a rabbit. Such a symptomless superinfection in syphilitic men had already been demonstrated by Kolle and his colleagues in experimentally infected rabbits. Such experiments would seem to indicate that the immunity of the syphilitic individual, even as in animals, is only an apparent immunity, a chancre immunity, which is not able to prevent the entrance of spirochetes into the organism. While these results throw new light upon the nature of the supposed "reinfection" of syphilis in a "cured case," the possibility that the spirochetes are latent in the case of paresis and grow when transferred to the new soil in the rabbit must be borne in mind. The theory of a superinfection cannot be regarded as proved beyond doubt.

Action of Novasurol on Trichina Infections. By H. CHÜKRI (Klin. Wochenschr., February 15, 1930, p. 298).

Jochweds and Pekielis in 1927 reported two human cases of trichinosis treated with novasurol with apparent great success. After the second injection of 1.2 ccm. intravenously the temperature fell, the facial swelling greatly decreased, the muscle pains almost wholly vanished, and the stools became normal. After a week one case appeared perfectly well except for a slightly subfebrile temperature and an eosinophilia of 30-40 per cent. The second case had a recurrence of symptoms on the 8th day after the first injection, but all symptoms disappeared within a few hours after the second injection and did not return. The authors asked the question as to the mechanism of the trichinocidal action of the novasurol. Since previously no drug has been known which will kill trichinae in the tissues or influence the course of trichinosis, it was deemed desirable to check up the observation made by Jochweds and Pekielis with experimental work. Chükri has therefore carried out experimental observations of the effect of novasurol upon rats infected with trichinae, with the following conclusions: Novasurol exerted no harmful or lethal action on intestinal, blood or muscle trichinae in the rat infected with such. No essential influence upon the course of rat trichinosis could be determined as the result of novasurol injections.

The Race and Sex Distribution of the Lesions of Syphilis in 10,000 Cases. By THOMAS B. TURNER (Bull. of Johns Hopkins Hospital, February, 1930, p. 159).

This paper is not concerned with the race and sex incidence in the general population, but with the incidence of the various manifestations of syphilis in a known syphilitic population. The statistics are based on the sex and race distribution of the lesions of syphilis among 11,818 consecutive admissions to the Syphilis Clinic of the Johns Hopkins Hospital above the age of 12 years. Of these patients 10,000 were syphilitics studied in sufficient detail to permit an accurate diagnosis, 996 were non-syphilitic and in 822 the diagnostic study was incomplete. The summary of this study is as follows: The total number of cases was approximately equally divided among the three stages of syphilis—early, tertiary and latent. Of the total cases 3.4 per cent had congenital syphilis. During the past 10 years there has been observed a steady decline in the number of cases of early syphilis in whites, especially white males. Genital chancres were observed but rarely in females. A slightly higher percentage of white males came under observation during the primary

stage than did colored males, and a much higher percentage of the former were seen in the sero-negative stage. Reinfection was observed more than 7 times as frequently in males as in females. Acute iritis occurred in 5.5 per cent of patients with secondary syphilis, although it was twice as frequent in negroes as in whites. The incidence of acute meningitis in whites was approximately twice that in negroes, and in males twice that in females. The incidence of neuro-occurrence was higher in whites than in negroes and higher in males than in females. In the late cases lesions of the skin and mucous membranes occurred with about equal frequency in the two races and the two sexes. The incidence in the late cases was 8.8 per cent. Lesions of the skeletal system were observed in 8.8 per cent of the total late cases. The incidence for whites was 5.7 per cent and for colored 9.4 per cent, while the incidence in each race was higher in the males. Syphilitic stricture of the rectum was confined almost wholly to colored females. Gumma of the lymph nodes was an uncommon manifestation. It occurred preponderantly in negroes. Clinically recognizable syphilitic affections of the cardiovascular system, excluding cerebral vascular lesions, occurred in 10 per cent of all late cases; the proportion of males to females and negroes to whites was approximately as 2 to 1. Uncomplicated aortitis, with or without aneurysm, occurred much more frequently in males than in females, and in negroes than in whites. Aortic regurgitation was more than twice as common in males as in females, although it was nearly as common in whites as in negroes. Syphilitic angina pectoris was rare, but was more common in whites and in males, respectively, than in negroes and females. Central nervous system syphilis was observed in late syphilis in 39.3 per cent of white males, in 22.3 per cent of white females, in 15.9 per cent of colored males, and in 7.0 per cent of colored females. When serious disabling types of central nervous system syphilis only are included, the percentages are for white males 27.6, for white females 12.0, for colored males 5.9, and for colored females 2.2. General paresis was 7 times as frequent in whites as in negroes, and 28 times as frequent in white males as in colored females. Tabes dorsalis with or without optic atrophy or Charcot joint was much more common in white males than in white females or negroes of either sex. It was exceedingly rare in negro females. Cerebral vascular syphilis was observed somewhat more frequently in negroes than in whites. Of the syphilitics observed in the period of latency the proportion of females to males was as 3 to 2. The incidence of pulmonary tuberculosis in the negro syphilitics was decidedly less than the incidence in the general negro population. The incidence of pulmonary tuberculosis among the general dispensary class was not available. Diabetes mellitus was no more frequent among syphilitics than among non-syphilitics.

Reviews

The Bellevue Hospital Nomenclature of Diseases and Conditions. Department of Hospitals, City of New York. Revised by the Committee on Clinical Records. Approved by Dr. William Schroeder, Jr., Commissioner. 232 pages. Paul B. Hoeber, Inc., New York, 1929. Price in cloth, $3.00.

The first edition of the Bellevue Nomenclature was published in 1903; the third edition in 1911. The latter, to which some additions were made in 1922, has been in use since that date in the City Hospitals of New York City, as well as in many hospitals throughout the United States and Canada. In 1928 the committee appointed to revise the Nomenclature was instructed to make additions of new diagnoses rather than to reclassify and alter the old ones. Nevertheless, some change in the classification of disease had to be made to conform with the advances in medical knowledge. A few new subdivisions have been added, as Diseases of Allergy, of Metabolism and of Deficiency. The most radical charge has been made in the cardiac section. Two subsections have been added, providing for etiological and physiological diagnoses. It is the intention to revise the Nomenclature once every five years. A captious critic might point out many deficiencies in this Nomenclature. Coccidioidal granuloma is not mentioned. Agranulocytosis is classed among the infectious diseases, in the index syphilis of the heart is not mentioned, but syphilis of the thyroid and thymus are, a strange evaluation of relative frequency and importance, Hodgkin's is put in the Miscellaneous Diseases, the term lymphoblastoma does not appear, the term acrodynia is preferred to Swift's disease, or Swift-Feer, etc. The classifications used savor too much of desk-research, rather than of a practical knowledge of modern nosology and pathology.

Clinical Atlas of Blood Diseases. By A. Piney, M.D., M.R.C.P., Research Pathologist, Cancer Hospital, London; Consulting Pathologist, Chelmsford Hospital; and Stanley Wyard, M.D., M.R.C.P., Physician, Bollingbroke Hospital and Assistant Physician, Cancer Hospital, London. 99 pages, 3 illustrations, 32 in color. P. Blakiston's Sons and Co., Inc., Philadelphia, 1930. Price in cloth, $4.00 net.

The publication of yet another book on clinical hematology might seem to require some justification, but the present one is intended to fill a need for which no other recent book even pretends to cater. The numerous atlases published at various times all have grave defects from the standpoint of the busy practitioner and the student. Many of them, such as Pappenheim's, contain so many illustrations that it is difficult for the non-specialist to make any practical use of them. More recent atlases give much space to the illustration of blood-pictures, but very little explanatory material. The present authors have tried to combine in one small volume the essential features of a textbook of hematology with an atlas, so that the practitioner will be able to find an account, albeit brief, of any hematogic malady with which he comes in contact, or conversely when presented with a blood-film, will be able to find an illustration corresponding with, at least, its general characters. The pictures have been all prepared from films stained by the Jenner-Giemsa method, except where noted. In all cases the magnification is 1,000 except for Plate 26, which is only 500. This is an interesting and valuable little atlas; the blood pictures are much better than the accompanying text. The pathology of the various conditions given is particularly poor. For instance, the statement is made the "Hodgkin's disease is no longer regarded as neoplastic," in spite of the increasing evidence

to that effect. Further, the authors seem to have little knowledge of the recent literature on the genetic neoplastic relationships of the leukemic and aleukemic lymphoblastomas, Hodgkin's, and mycosis fungoides. Ayerza's disaese is not mentioned but a mistaken translation of "Cardiacos negros" is. The genetic relationships between Gaucher's disease, Niemann-Pick disease and generalized xanthomatosis is not hinted at; and there are many more omissions and deficiencies in the text, that may be explained by the great variation of opinion as to the nature of the condition described, and the difficulties attending the assemblage of these differences of opinion in so restricted a space. We believe, however, that the pictures are the best part of this book, and that they will be of great help to the medical student and to the worker in hematology.

Diseases Transmitted from Animals to Man. By THOMAS G. HULL, Chief Bacteriologist, Illinois Department of Public Health; Assistant Professor of Pathology and Bacteriology, University of Illinois, College of Medicine. With an Introduction by Veranus A. Moore, Director, New York State Veterinary College, Cornell University. 352 pages, 29 illustrations, 43 tables. Charles C. Thomas, Springfield, Illinois, 1930. Price in cloth, $5.50.

Diseases which may be transmitted from animals to man immediately concern several groups of workers: the veterinarian, the physician, the laboratory worker and the health authorities. Each of these is engaged with a different phase of the problem, however, and views the subject from a different angle. Each has a different problem and approaches the subject from his individual standpoint. In this book, an attempt has been made to present each disease against a brief historical background, emphasizing its epidemiology and means by which infection may be prevented. Sufficient bacteriology is presented to balance the other material. There has been no special effort to present the special pathology, clinical symptoms or treatment, either in man or animals, although these subjects have not been wholly neglected. The material in this book is very complete and valuable, and is well presented. It is thoroughly up to date; such recent subjects as Psittacosis, Tularemia and Undulant Fever being discussed fully as far as our knowledge of them goes. This book should be added to every internist's library, inasmuch as it contains so much valuable material bearing upon the occurrence of animal infections in man, information which should be added to the practical knowledge of all practitioners.

The Bacteriophage and Its Clinical Applications. By F. D'HERELLE, Professor of Bacteriology, Yale University School of Medicine. Translated by George H. Smith, Professor of Immunology, Yale University School of Medicine. 254 pages, numerous tables and charts. Charles C. Thomas, Springfield, Illinois, 1930. Price in cloth, $4.00.

Each of the chapters of this text corresponds to one of the Lane Lectures, delivered at the Leland Stanford University, in October of 1928. In these lectures an effort was made to explain as fully as possible the extremely complicated subject of bacteriophagy, and to make the text understandable to all intelligent persons, although addressed especially to practitioners of medicine. The therapeutic applications derived from these phenomena are considered, and it is claimed that these applications are daily being extended to embrace more and more diseases, and that today in most of the large hospitals of the world they form a recognized form of treatment. In this little volume D'Herelle expresses his concept of the nature of life. The six lectures are concerned with Bacteriophagy, Bacterial Mutations, Nature of Bacteriophage, Infectious Diseases, Recovery and Immunity and the Use of Bacteriophage. The theories advanced in the Conclusions of this little book are so revolutionary that one of necessity hesitates as to their evaluation. If he is correct the cellular theory of life is shaken to its foundations and must be replaced by the theory of elementary micellae, which D'Herelle names "Protules." Such revolutionary and iconoclastic theories cannot be swallowed off-hand. Much more evidence

than D'Herelle assembles is necessary for their establishment.

Practical Psychology and Psychiatry. By B. B. BURR, M.D. Sixth Revised and Enlarged Edition, 378 pages, with 12 illustrations. F. A. Davis Company, Philadelphia, 1930. Price in cloth, $3.50.

This manual is intended for use in training-schools for attendants and nurses and in medical classes, and as a ready reference for the practitioner. The first edition appeared in 1898. The psychology section has been rather radically revised; certain new methods in treatment have received attention, and the chapter on the prevention of insanity has been enlarged and improved. A brief chapter on aberrations in the sexual sphere has been added, as have also records of recent work in connection with paralytic dementia. The book is divided into five parts Part I, Psychology, the Science of Mind; Part II, Symbolism in Sanity and Insanity; Part III, Insanity; Part IV, Management of Cases of Insanity; and Part V, the Prevention of Insanity. The treatment of these various subjects is necessarily brief, but commendable for its sanity and good sense. The main symptoms of the common forms of insanity are given, and a general outline of the treatment is added. The chapters on the prevention of insanity and on Mental Hygiene are very good. Still better is the sane attitude of the author toward crimes of the Loeb and Leopold and Hickman type, and the danger of sentimental extenuation of such crimes and of leniency toward such criminals.

Getting Well and Staying Well. A Book for Tuberculous Patients, Public Health Nurses and Doctors. By JOHN POTTS, M.D. Introduction by J. B. McKnight, M.D., Superintendent and Medical Director, Texas State Tuberculosis Sanatorium. Second Edition, 221 pages. The C. V. Mosby Co., St. Louis, 1930. Price in cloth, $2.00.

Tuberculosis work is a teaching business. Nearly everything that physicians learn of this disease, its prevention, cause and cure, must be translated into language for laymen's use. In all cases of tuberculosis there is a divided responsibility. This book is written in the hope that it will aid patients, nurses and physicians in learning where their personal responsibility begins and where it ends. It is also written to furnish answers to many of the numberless questions that come into the minds of patients, their families and family physicians. The book is not the story of any one patient's personal experiences, but of many patients, many families, and many physicians, the rich and the poor, the educated and the uneducated. For the purpose of emphasis many thoughts are repeated again and again. This is a very practical and valuable book to be placed in the hands of the tuberculous patient. Patients, physicians and nurses will obtain much benefit from its perusal. It presents the details of the patient's daily routine in a simple and thoroughly practical manner. The dangers and pitfalls that beset the case of tuberculosis are described in simple but effective language. The book is filled with good sound sense, acquired from a wide experience in dealing with tuberculous patients. The chapters on "Suspecting Tuberculosis" and on "Diagnosis" are especially well-written, and should be read by every physician entering the field of active practice.

Symptoms of Visceral Disease. A Study of The Vegetative Nervous System in Its Relationship to Clinical Medicine. By FRANCIS MARION POTTENGER, A.M., M.D., LL.D., F.A.C.P., Medical Director, Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. Fourth Edition. 426 pages, 87 text illustrations and 10 color plates. The C. V. Mosby Co., St. Louis, 1930. Price in cloth, $7.50.

The fact that this book has reached its fourth edition in so short a time shows the interest created by this contribution to the newer physiologic medicine. In this, the fourth edition, the author has attempted to discuss the principles involved in the study of visceral neurology, and to correlate them in such a manner as ot make them readily applicable to clinical problems. He emphasizes throughout the discussion the important

fact that action in a given case depends primarily upon the constitutional background of the patient, and secondarily upon the changes that are produced in that inherited structure by the environment. The influence of emotions upon the nerves and endocrines is stressed in such a manner as to emphasize the fact that abnormal physiologic action can result as much from psychical as from physical stimuli. The fact that the chief function of the vegetative nervous system is that of correlating and integrating action whereby activity in each organ and structure is brought into harmony with other organs and structures in states of health and into disharmony in conditions of disease receives greater emphasis in this than in the previous editions. Extensive additions have been made to many chapters, and a new chapter on Pharmacologic and Clinical Tests for Sympathicotonia and Parasympathicotonia has been added. The section on the lungs has been made particularly complete, and contains a classification of reflexes according to the afferent and efferent components which are responsible for the reflex. This same grouping of reflexes can be worked out for other important organs, and this is the task which the author has set for himself for the future. After an introductory chapter in which modern conceptions of disease are discussed, the material of the book is divided into three parts Part I, The Vegetative Nervous System, treating of its anatomy and physiology; Part II, The Relationship Between the Vegetative Nervous System and the Symptoms of Visceral Disease; and Part III, The Innervation of Important Viscera with a Clinical Study of the More Important Viscerogenic Reflexes. In this book Dr. Pottenger has assembled much important material not to be found together elsewhere. It is a valuable contribution to diagnostic medicine. The book is well printed, and the illustrations excellent. It is a work necessary to the up-to-date physician of today, and is warmly recommended.

Lister Centenary Celebration. American College of Surgeons, Detroit, Michigan, October, 1927. Descriptive Catalogue. Presented by the Wellcome Historical Medical Museum, London.

This beautiful catalogue was prepared for the Official Exhibition at the Lister Centenary Celebration held under the auspices of the American College of Surgeons at Detroit, Michigan, 1927, in connection with the centenary of the birth of Sir Joseph Lister. The Founder and Director of the Wellcome Historical Medical Museum, London, acquired the materials and was responsible for the official Lister Centenary Exhibition in the land of Listers' birth. The great interest and importance of that Exhibition was recognized at the Official Centenary Celebration held in London during April, 1927. Mr. Wellcome felt that a collection of objects illustrative of Lord Lister's life-work would be of interest to members of the Medical and Surgical Professions in America. He, therefore, prepared and presented, through his Museum, this collection of replicas, including pictures, models, etc., to the American College of Surgoens for their exhibition at the Lister Celebration in Detroit. It is his desire that this collection shall form a permanent Exhibit in the Museum of the American College of Surgeons. The Catalogue of Exhibits consists of photographs illustrating Lister's life, work and honors, arranged chronologically, antiseptics, dressings and other materials as used by Lister in surgical operations, reproductions of various experiments performed by Lister, copies of diplomas and certificates, illustration of Lister's apparatus, instrumnts, etc. All of these are elucidated by extracts from Lister's writings, by an account of the evolution of Lister's system of antiseptic surgery by Sir Hector C. Cameron, a life of Lord Lister, an account of pioneer work in antiseptic surgery, a review of various experimental researches by Lister, with sections on the influence of Lister's work and Lister's honours. The remainder of the catalogue is occupied with an account of the ceremonies attending the opening of the Wellcome Historical Museum, June 24, 1913. The volume is beautifully printed and is a valuable memento of the occasion.

College News Notes

Dr. Sam E. Thompson (Fellow), Kerrville, Texas, has been elected Governor of the 47th District of Rotary International, representing practically all of the southern part of Texas.

The American Commission of the International Hygiene Congresses has formally invited the American College of Physicians and its members to be represented at the world health sessions to be held in Dresden, May 15—September 30, 1930. It is said that over two hundred scientific organizations will have their annual conventions converge in Dresden during this period, and will meet with the delegates of the League of Nations and twenty foreign governments whose participation in the Dresden meeting has been specified by legislative enactment. Complete details of the Congresses may be obtained by addressing Dr. R. Woerner, 393 Seventh Avenue, New York, N. Y.

Dr. George E. Holtzapple (Fellow) and Dr. Julius H. Comroe (Fellow), both of York, Pa., have been promoted to the post of Advisor and Consultant to their respective groups of Visiting Physicians of the York Hospital.

The following Fellows of the College were on the program at the February meeting of the Homeopathic Medical Society of the County of Philadelphia:

Dr. G. Harlan Wells, Philadelphia, "Insulin Treatment; its Action; Indications; Dosage; Technique".

Dr. Donald R. Ferguson, Philadelphia, "Common Metabolic Accidents to the Diabetic with Treatment".

Dr. Linn J. Boyd (Fellow), New York, N. Y., is the author of an article, "The Arudt-Schulz Phenomenon and Homeotherapy", which appeared in the February number of the Journal of the American Institute of Homeopathy. The paper was read before the Bureau of Drug Pathogenesis, 58th Annual Convention of the American Institute of Homeopathy, Montreal, Canada, June, 1929.

Dr. Joseph McFarland (Fellow), Philadelphia, Professor of Pathology, University of Pennsylvania School of Medicine, delivered the address at the Pasteur Assembly held at the Philadelphia College of Pharmacy on January 8.

Dr. L. Winfield Kohn (Fellow), New York City, was elected President of the Baltimore Medical Club for 1930-31 on February 13, 1930, at the meeting of the Club at the Commodore Hotel, New York. The guests of honor were Dr. Alexius McGlannan, Professor of Surgery, University of Maryland, and Dr. Harvey B. Stone, Associate in Surgery, Johns Hopkins University Medical School.

Dr. Harold Swanberg (Fellow), Quincy, Ill., is the author of an article entitled "Roentgen Pelvimetry (Thoms Method) and its Significance in Obstetrics" appearing in the March Issue of the Quincy Medical Bulletin.

Dr. Dean B. Cole (Fellow), Richmond, Va., is the President of the Virginia Tuberculosis Association. Their annual meeting was held at Roanoke, Virginia, on February 28. Dr. H. Kennon Dunham (Fellow), Cincinnati, was the chief speaker at the evening session.

The Southwestern Virginia Medical Society held its semi-annual meeting at Radford (Virginia) on March 24-25, and was addressed by Dr. W. S. Leathers (Fellow), Dean of the School of Medicine, Vanderbilt

University, Nashville, Tenn., on the subject, "Preventive Medicine".

The Medical Society of Virginia will hold its annual meeting for 1930 at Norfolk on October 21, 22, and 23. Dr. William S. Thayer (Fellow), Baltimore, Maryland, will be one of the specially invited guests.

Dr. Walter Freeman (Fellow), Washington, D. C., was one of the guest speakers of the Philadelphia College of Physicians, Section on Medical History, on March 10, 1930. Dr. Freeman's subject was "Lewis Morgan: The Note Book of a Tory Medical Student".

Dr. Alf Hoff (Fellow), has been elected Chief of Staff of the Ancker Hospital, of St. Paul, Minn.

Dr. Virgil E. Simpson (Fellow), Louisville, Ky., delivered an address by invitation at the annual meeting of the Fayette County Medical Society, March 9, 1930, on the subject "Mendelian Law in Medicine".

Among new Regents of the American College of Physicians, elected during the Minneapolis Clinical Session, is Dr. Walter L. Bierring (Fellow), of Des Moines, Iowa, who is the President of the National Board of Medical Examiners.

Among members of the Executive Committee of the National Board of Medical Examiners are the following Fellows of the College:

Dr. Lewis A. Conner, New York, N. Y.

Surgeon General H. S. Cumming of the U. S. Public Health Service.

Surgeon General M. W. Ireland of the U. S. Army.

Dr. Waller S. Leathers, Nashville, Tenn.

Dr. David Riesman (Fellow), Philadelphia, was recently elected President of the Medical Board of the Philadelphia General Hospital. Dr. Riesman succeeds Dr. Herman Bryden Allyn (Fellow), Philadelphia, who had been President of the Medical Board for the past twenty-two years, and who recently resigned.

Dr. Daniel J. McCarthy (Fellow), Philadelphia, will have charge of the neurologic Foundation at Temple University.

Dr. David A. Tucker, Jr. (Fellow), Cincinnati, is author of an article, "Medical Education", which appeared in the February Number of Clinical Medicine and Surgery.

Dr. William Devitt (Fellow), of Devitt's Camp, Allenwood, Pa., was the speaker at the "Health Talk" under the auspices of the Philadelphia County Medical Society on February 25. His subject was "Diet and Dissipation and Tuberculosis".

Dr. Carl V. Vischer (Fellow), Philadelphia, is author of the contributed article for December in the Hahnemannian Monthly, "Acute Miliary Tuberculosis: Report of Cases with Recovery".

Major L. R. Poust (Fellow), formerly stationed at the Station Hospital, Fort Sam Houston, Texas, as Chief of the Tuberculosis Section, was recently transferred to Manila, P. I., where he is serving as Chief of the Medical Service in Sternberg General Hospital.

Acknowledgment is made of the receipt of the following publications contributed by the authors to the Library of the American College of Physicians:

Dr. William H. Riley (Fellow), Battle Creek, Mich.

"The Reactions of the Body to the Short Cold Bath.".

"A Clinical Study of 264 Cases of Pernicious Anemia with Special Reference to the Involvement of the Central Nervous System".

Dr. George L. Waldbott (Associate), Detroit, Mich.

"Allergy as Cause of Epileptiform Convulsions".

Dr. B. S. Pollak (Fellow), Secaucus, N. J.

"Tuberculin as a Diagnostic and Therapeutic Agent in Tubeculosis".

"Some Points in the Early Diagnosis of Clinical Tuberculosis"

"Oration in Medicine".
"The Relation of Tuberculosis to Other Communicable and Preventable Diseases".
"Pulmonary Hemorrhage; Its Etiology, Pathology and Therapy".
"Tuberculosis in Infancy and Childhood".
"The Heritage of Sanitation".

Dr. George E. Pfahler (Fellow), Philadelphia, is the author of an article, "Shall Cancer of the Uterus be treated by Surgery or Radiation?", which appeared in the February number of the Pennsylvania Medical Journal.

Dr. G. Harlan Wells (Fellow), Philadelphia, was recently appointed an Associate Editor of the Journal of the American Institute of Homeopathy.

Dr. Linn J. Boyd (Fellow), New York, is author of an article "Neglected Aspects of Symptomatology," which appeared in the January Number of the Journal of the American Institute of Homeopathy.

Dr. G. Morris Golden (Fellow), Philadelphia, is author of an article, "Silent Gap in Blood Pressure: Its Clinical Significance, which appeared in the December Issue of the Hahnemannian Monthly.

Major L. R. Poust (Fellow), Chief of the Medical Service, Sternberg General Hospital, Manila, P. I., has tendered his services to the Philippine Anti-Tuberculosis Society, and is now instructing a group of Filipino doctors at Santol Hospital for the tuberculous, the indications for, and the institution of collapse therapy, in the treatment of pulmonary tuberculosis.

During the Annual Congress on Medical Education, Medical Licensure and Hospitals, held in Chicago, February 17-19, 1930, the following Fellows of the College delivered stated addresses:

Dr. William Gerry Morgan, President-Elect of the American Medical Association, Washington, D. C.

Dr. Ernest E. Irons, Clinical Professor of Medicine and Dean, Rush Medical College, Chicago, Ill.

Dr. Torald Sollman, Professor of Pharmacology and Materia Medicao and Dean, Western Reserve University School of Medicine, Cleveland, Ohio.

Dr. W. McKim Marriott, Professor of Pediatrics and Dean, Washington University School of Medicine, St. Louis, Mo.

Dr. L. G. Rowntree, Professor of Medicine, Mayo Foundation for Medical Research, Rochester, Minn.

Dr. D. J. Davis, Dean, University of Illinois College of Medicine, Chicago, Ill.

Dr. Howard T. Karsner, Professor of Pathology, Western Reserve University School of Medicine, Cleveland, Ohio.

Dr. Charles C. Bass, Professor of Experimental Medicine and Dean, Tulane University School of Medicine, New Orleans, La.

Dr. Kenneth M. Lynch, Professor of Pathology, Medical College of the State of South Carolina, Charleston, S. C.

Dr. Waller S. Leathers, Dean, Vanderbilt University Medical School, Nashville, Tenn.

Dr. James B. Herrick, Professor of Medicine, Rush Medical College, Chicago, Ill.

Dr. Peter Murray, New York, N. Y.

Dr. Merritte W. Ireland, Surgeon-General, United States Army, and Member of the Council on Medical Education and Hospitals of the American Medical Association, Washington, D. C.

Dr. Walter L. Bierring, Secretary, Federation of State Medical Boards, Des Moines, Iowa.

Dr. David P. Barr, Busch Professor of Medicine, Washington University School of Medicine, St. Louis, Mo.

Dr. Arthur D. Dunn, Professor of Clinical Research, University of Nebraska College of Medicine, Omaha, Nebr.

Dr. Edwin Henes, Jr. (Fellow), reports that the published proceedings of the Detroit Assembly of the Interstate Postgraduate Medical Association, of which he is Editor, will appear early in April. The volume will be dedicated to Thomas A.

Edison, and will contain the entire Detroit Program, to which many Fellows of the College contributed.

Dr. W. Samuel Kerlin (Fellow), Shreveport, Louisiana, was recently elected First Vice President of the Shreveport Medical Society.

Dr. Warren T. Vaughan (Fellow), Richmond, Virginia, was recently elected Second Vice President of the Richmond Academy of Medicine.

Dr. W. Bernard Kinlaw (Fellow), Rocky Mount, North Carolina, has been elected a Vice President of the Seaboard Medical Association of Virginia and North Carolina.

Dr. Beverley R. Tucker (Fellow), Richmond, Virginia, recently published a one-act play, "The Lost Lenore", dealing with the life of Edgar Allan Poe.

Dr. Otto T. Brosius (Fellow), has recently transferred from Superintendent, Medical Department, Chiriqui Land Co., Puerto Armuelles, R. of P., to Superintendent, Medical Department, United Fruit Co., Almirante, Bocas del Toro, R. of P.

Dr. Albert F. R. Andresen (Fellow), Brooklyn, has been Clinical Professor of Medicine (Gastroenterology) of Long Island College Hospital (Medical School) for the past ten years. He has also been attending physician (Gastroenterologist) to the Long Island College Hospital and Chief of the Gastroenterological Clinic at Polhemus Memorial Clinic. He is at the present time President of the New York Gastroenterological Association, Secretary of the Section on Gastro-Enterology and Proctology of the American Medical Association, Chairman of the Committee in charge of the Friday Afternoon Practical Lectures of the Medical Society of the County of Kings. He has recently delivered the following addresses:

"Medical Aspects of Gall-Bladder Disease", a lecture before the Medical Society of the County of Kings, December 6th, 1929.

"Medical Aspects of Peptic Ulcer", before a joint meeting of the Brooklyn Society of Internal Medicine and the Brooklyn Surgical Society, February 6th, 1930.

Dr. Noxon Toomey (Life Fellow), St. Louis, is the author of "The Treatment of Skin Diseases—in Detail." The work is Volume Three of Doctor Toomey's "Principles and Practice of Dermatology." The work was published by the Lister Medical Press, St. Louis, on March 15, 1930. It contains 512 octavo pages and fully discusses the treatment of the rarer as well as the commoner skin diseases, some three hundred in number.

Dr. Clifford J. Barborka (Fellow), Rochester, presented a paper on "The Results of the Use of the Ketogenic Diet in One Hundred Cases of Adult Epilepsy" before the Association for Research in Nervous and Mental Diseases at the Commodore Hotel, New York City, on December 28, 1929.

Dr. E. L. Sevringhaus (Fellow), Associate Professor of Medicine at the University of Wisconsin Medical School, has been pursuing postgraduate study at the Graduate School of Medicine of the University of Pennsylvania. He was a recent visitor at the College headquarters.

Acknowledgment is made of the following gifts to the College Library of publications by members of the College:

Dr. Frank Smithies (Master), Chicago, Ill.:

1 Books:

"Cancer of the Stomach" (with Albert J. Ochsner, M. D.)

Reprints:

"Tuberculous Enterocolitis" (With Weisman & Fremmel.)

"Parasitosis of the Bile Passages and Gall Bladder"

"On the Present Status of the Treatment of Peptic Ulcer."

"Protozoiasis Occurring in Temperate Zone Residents."

"The Phenomena Concerned with "Reactions' Following the Transfusion of Blood" (With Kordenat)

"Biliousness"

"Certain Factors to be Considered in Prognosing Cure of Peptic Ulcer"

"Aseptic Irritative Phlebitis Following Intravenous Injection of Sodium Salt of Tetrabromphenolphthalein" (With Oleson)

"Necessity for Caution in the Employment of High Voltage Roentgen-Rays as a Therapeutic Agent Against Malignant Diseases: Acute Adrenal Insufficiency and Death as Sequelae"

"The Visualization of the Biliary Tract. A New Method by Intravenous Injections of Tetrabromphenolphthalein" (With Oleson)

"Diagnosis and Clinical Manifestations of Cardiospasm Associated with Diffuse Dilatation of the Esophagus"

"Late Cardiorespiratory Manifestations of 'Gassing' As Exhibited by Returned Soldiers"

"Significance of Etiologic Factors in the Treatment of Peptic Ulcer"

"Pericholecystitic Adhesions"

"The Nonsurgical Management of Peptic Ulcer by the 'Physiologic Rest' Method"

"Chronic Intestinal Stasis and Its Associated So-Called Toxaemia"

"Blood-Cell Changes in Gastric Cancer"

"Contributions of the Twentieth Century Toward a Better Understanding of Gastro-Intestinal Ailments"

"Present-Day Treatment of Intestinal Protozoiasis and Factors that Determine Its Efficacy"

"Anemia of the 'Hemolytic' or 'Pernicious' Type Consequent Upon Chronic Lead Poisoning; Arteriosclerosis; Myocardial Hypertrophy and Degeneration; Infections of Gums and About the Roots of the Teeth"

"Observations upon the Phenoltetrachlorphthalein Test for Liver Function" (Higgins)

"Syphilis of the Colon and the Lower Bowel with Report of Three Cases" (Karshner)

Dr. Virgil E. Simpson (Fellow), Louisville, Ky.:

Reprints:

"Tularemia"

"Diseases of the Cardiovascular System Due to Acquired Syphilis"

"A Discussion of the Probable Etiological Relationship Between Peptic Ulcer and Vagatonic Syndromes"

Dr. Frederic J. Farnell (Fellow), Providence, R. I.:

Reprints:

"Industry and Social Welfare"

"Welfare and Mental Hygiene"

"The Unmarried Mother"

Dr. Philip B. Matz (Fellow), Washington, D. C.:

Reprint:

"Improved Colorimetric Procedures for the Quantitative Estimation of the Proteins of the Cerebrospinal Fluid" (With Novick)

Dr. Joseph D. Gray (Fellow), Augusta, Ga.:

Reprint:

"Agranulocytosis"

Dr. Miles J. Breuer (Fellow), Lincoln, Nebr.:

Reprint:

"Mental Hygiene of Adolescence"

Dr. Walter M. Simpson (Fellow), Dayton, Ohio:

Reprint:

"Recent Developments in Tularemia"

Dr. Milton C. Borman (Fellow), has left Montgomery, W. Va., and is now located at the Sacred Heart Hospital, Milwaukee, Wisconsin.

Dr. Murray B. Gordon (Fellow), Clinical Professor of Pediatrics, Long Island College Hospital, New York, addressed the Medical Society of the County of Nassau, Mineola, Long Island, on "Endocrine Diseases and Disorders in Children" on February 27, 1930, and the Health Forum of the United Israel Zion Hospital, Brooklyn, on "How to Prevent Contagious Diseases in Children" on March 5, 1930.

Dr. F. Garm Norbury (Fellow), Associate Physician, Norbury Sanatorium, Jacksonville, Illinois, departed March 29th for Amsterdam, Holland.

Dr. Norbury will do special work in the University of Amsterdam, Department of Neurology, under Prof. B. Brouwer, and Post-graduate course in Psychiatry, Maudsley Hospital, London.

COLLEGE MEMBERSHIP

At the Minneapolis Clinical Session, 201 Fellows were inducted to Fellowship and 67 Associates were elected. The total membership now numbers 2,360, of which 6 are Masters, 1800 are Fellows and 554 are Associates.

Among the Fellows and Masters, there are 19 Life Members who have subscribed to the Life Membership Fund. The complete list is printed below.

Lewellys F. Barker	Baltimore, Md.
Oscar Berghausen	Cincinnati,, Ohio
Robert Bernhard	New Orleans, La.
Carl R. Comstock	Saratoga Springs,, N. Y.
Ernest Falconer	San Francisco, Calif.
J. A. Lepak	St. Paul, Minn.
Charles F. Martin	Montreal, Que., Can.
Nels C. Meling	Evanston, Ill.
Francis Pottenger	Monrovia, Calif.
Austen Fox Riggs	Stockbridge, Mass.
John G. Ryan	Denver, Colo.
Adolph Sachs	Omaha, Nebr.
William D. Sansum	Santa Barbara, Calif.
Frank Smithies	Chicago, Ill.
Alfred Stengel	Philadelphia, Pa.
Noxon Toomey	St. Louis, Mo.
M. L. Turner	Berwyn, Md.
A. H. Waterman	Chicago, Ill.
Bernard L. Wyatt	Tucson, Ariz.

1931 CLINICAL SESSION

March 23-28, 1931, has been set for the time of the Fifteenth Annual Clinical Session of the American College of Physicians at Baltimore, Maryland. By resolution of the Board of Regents, adopted at the last Clinical Session, the President of the College becomes responsible for the General Scientific Programs, during the afternoons and evenings. The local General Chairman is responsible for the general arrangements and for the programs of Clinics and Demonstrations at the various hospitals and institutions. Dr. Sydney R. Miller, President, therefore, is preparing the general program of scientific papers, and Dr. Maurice C. Pincoffs is arranging the program of clinics. Both of these officers will appreciate helpful suggestions and recommendations from members of the College.

OMISSION

In the March Issue of ANNALS OF INTERNAL MEDICINE, in the list of new Officers of the American College of Physicians for 1930-31, the name of Dr. John A. Lichty, Clifton Springs, New York, was omitted as the Third Vice President.

REGENTS' MEETING

A special meeting of the Board of Regents will be held at the College headquarters in Philadelphia on May 4, for the purpose of examining the credentials of new candidates for Fellowship, for determining the final details of the John Phillips Memorial Fund, for preliminary plans for the Fifteenth Annual Clinical Session at Baltimore in 1931 and to transact the regular business of the College.

Inasmuch as the regulations of the Board of Regents require that proposals for Fellowship be on file thirty days in advance of action, only those proposals received up to and including April 5 will be acted upon at this meeting.

The Board of Regents will probably hold their regular fall meeting during the month of November.

NEW ADVERTISERS

Attention of readers and subscribers is drawn to the following new advertisers in this issue of ANNALS OF INTERNAL MEDICINE:

Page 3 Devitt's Camp, Allenwood, Pa.

Page 14 The Wyatt Clinic, Tucson, Ariz.

Page 17 Lister Medical Press, St. Louis, Mo.

The Columbus Rural Rest Home also has returned to our advertising columns, although they are not new.

Fellows of the College are in each case responsible for this support given to ANNALS OF INTERNAL MEDICINE; Dr. William Devitt, F.A.C.P., is the Physician-in-Charge of Devitt's Camp; Dr. Bernard L. Wyatt is the head of The Wyatt Clinic; and Dr. Noxon Toomey, F.A.C.P., is the author of the book, "Treatment of Skin Diseases in Detail", advertised by the Lister

Medical Press. It is hoped that these advertisers, as well as every other one who has advertised in our journal in the past, will be well supported by Fellows and Associates of the College, and by our readers and subscribers everywhere.

PLACEMENT SERVICE

Announcement in the February Issue of ANNALS OF INTERNAL MEDICINE of the fact that the Executive Offices will act as a sort of clearing house through which members of the College may seek assistants or may obtain new connections, has resulted in some additional positions, as well as candidates, having been reported.

The College will assist in securing authentic information, but cannot assume responsibility in connection with recommendations. The purpose of the Executive Offices is to serve the membership in the best possible ways. Inquiries should be sent to E. R. Loveland, Executive Secretary, 133-135 S. 36th Street, Philadelphia, Pa.

VACANCIES

No. 101—For a young man, graduated from a good school, and with good hospital training, who is particularly interested in clinical laboratory work and pathology, and who has also had some ground work in radiological work. Should be capable of heading up the entire laboratory department, including the clinical laboratory and the X-ray department. Preference for an unmarried Protestant. Location in the South.

APPOINTMENTS DESIRED

No. 1—Internist, M.D., F.A.C.P., 38 years of age, married, ten years private practice, desires association with older man or clinic where there are opportunities for advancement. Mainly interested in diseases of chest and stomach. Will go anywhere but prefers city in South West. Personal interview may be arranged.

No. 3—An Associate of the College desires an assistantship, associateship or partnership in Chicago; 40 years of age; M.D., Rush Medical College; wide experience in both teaching and practicing Pediatrics.

No. 4—An Associate of the College desires an assistantship or an association with some good clinic; willing to go anywhere, if there is a promising future; personal interview desirable, as well as period of probation to show ability; extensive training and experience in diseases of the heart and lungs and in insurance examinations; age 36, married; M.D., Tulane University; postgraduate work in Internal Medicine at New York, Chicago, Philadelphia and Mayo Clinic; special examiner during World War in diseases of heart and lungs; since engaged in civil practice, doing only Internal Medicine, with important teaching and hospital appointments.

NATIONAL HOSPITAL DAY

Hospitals throughout the United States and Canada are beginning plans for the tenth observance of National Hospital Day, May 12, according to information reaching Dr. J. R. Morrow, superintendent, Bergen Pines, Oradell, N. J., chairman of the National Hospital Day Committee of the American Hospial Association.

While some institutions which have observed the day since its start are seeking new ideas, the majority of the hospitals will have "open house", reunion of babies, inspection of departments and other features which met with such success in previous years. Some of them undoubtedly have had the same experience as a hospital which decided to omit its "baby show" one year and found that the mothers, who had gathered in larger numbers than on the provious occasion, were greatly disappointed.

That more small hospitals will observe May 12 this year than in the past is the belief of some of the members of the National committee, owing to the tribute paid to small hospitals in rural sections by President Hoover in his endorsement of National Hospital Day.

Hospital councils in some cities focus all their attention at March and April meetings on plans for a joint observance of National Hospital Day. The Chicago Hospital Asso-

ciation is among those doing this at this time. This association, incidentally, already has been tendered time on two radio stations.

The national committee is in touch with large manufacturers and others using nation-wide radio hookups and hopes to extend the radio publicity given National Hospital Day last year. Many hospitals also are making arrangements for individual radio programs, as in the past.

Most of the hospitals conducting schools of nursing which will have a National Hospital Day program will give considerable attention to a presentation of facts about nursing education and nursing service, keeping in mind that May 12 is the anniversary of the birth of Florence Nightingale.

OBITUARY

Dr. Florence Chadwick (Fellow), Detroit, Michigan, died on October 31, 1929. She was born at North Dighton, Mass., in 1879, and attended the Massachusetts Normal School and the Boston Normal School of Gymnastics. Later she determined to follow a medical career, and attended the Medical School of the University of Michigan, from which she graduated in 1912. After a year's internship in the New England Hospital of Boston, she went to Detroit, spending one year as interne and another year as resident physician in the Woman's Hospital.

She was a member of the Alpha Omega Alpha, Sigma Psi and Alpha Epsilon Iota Fraternities. She was a member of the Wayne County Medical Society, the Michigan State Medical Society, the American Medical Association, and had been a Fellow of the American College of Physicians since February 24, 1926.

She won the respect and admiration of her colleagues, both as a physician of great ability and as a woman of high ideals. To her patients, she was an indefatigable worker, constantly at their service as a friend or counselor both in sickness and in health. To the community she contributed generously of her time and skill through her many years of charitable work at Harper Hospital, Woman's Hospital and the Children's Aid Society. She was a powerful character, as a member of the Central Bureau of Nurses, in approving nursing conditions in Detroit. Her death was a grievous loss to her colleagues, her clientele and the entire community.

Dr. Samuel K. Pfaltzgraff (Associate), York, Pa., died November 22, 1929, following a sudden attack of coronary thrombosis. He was one of York's leading physicians, and at the time of his death was Dermatologist to the York Hospital and President of the general staff.

Dr. Pfaltzgraff received his early training in the York County Academy, and was graduated from the University of Maryland in 1886. He later took several postgraduate courses in various medical schools, more especially in the domain of Dermatology. He was a member of his county and state medical societies, of the American Medical Association, and an Associate of the American College of Physicians.

Dr. Pfaltzgraff served as coroner of York County, was a member of the City Board of Health, and also a member of the board of school control. He was also a very prominent figure in Democratic politics, being a delegate to the national conventions in Baltimore, St. Louis and San Francisco. He declined the office of postmaster, during the administration of President Wilson.

During the World War, Dr. Pfaltzgraff was a member of the Medical Advisory Board, and was very active in all patriotic movements. He was a member of numerous civic and benevolent organizations. In his will, he directed that the sum of ten thousand

dollars be given to the York Hospital for the establishment of a dermatological clinic. He is survived by his wife, Mrs. Mary Pfaltzgraff.

(Supplied by Julius H. Comroe, M.D., F.A.C.P., York, Pa.)

Dr. James Irvin Johnson (Fellow) of Pittsburgh died suddenly on Sunday, February 9th, of coronary disease.

Dr. Johnston was born in the year 1868, graduated from the University of Pennsylvania in 1893; Interne, Presbyterian Hospital, Philadelphia, 1893-95; Staff Physician, Presbyterian Hospital, Pittsburgh, 1895-1907; Physician Roselia Foundling Asylum 1895-99. At the time of his death he was Senior Physician and Vice-President of Staff at Mercy Hospital, Pittsburgh; Assistant Professor of Medicine, University of Pittsburgh School of Medicine; Consulting Physician, Eye and Ear Hospital, Pittsburgh. He was a member of Phi Alpha Sigma fraternity; ex-President, Pittsburgh Academy of Medicine (1917); President (1929), Allegheny County Medical Society; Chairman, Section of Medicine (1922), Pennsylvania State Medical Society; Fellow, American Medical Association; Member, American Therapeutic Society; Associate Fellow, Society for Biological Research; Fellow, American College of Physicians since 1917. He was author of a number of articles in medical journals and co-author of "Epidemic Influenza," a book published by the University Press, Pittsburgh.

Dr. Johnston is survived by his widow, Mrs. Bertha G. Johnston, two sons, S. Paul Johnston and Dr. John M. Johnston, and an adopted son, Samuel E. Gill.

Dr. Johnston's useful career was seldom interrupted by illness, and he continued his professional activities until a few hours of his death.

(Furnished by E. Bosworth McCready, M.D., Pittsburgh, Pa., Governor for Western Pennsylvania.)